

Drinking Water Quality Management Plan (DWQMP) Annual Report

1 July 2020 to 30 June 2021

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Glossary of terms	
ADWG	Australian Drinking Water Guidelines (2018). Published by the National Health and Medical Research Council of Australia
CCP	Critical Control Point
CFU/100mL	Colony Forming Units per 100 millilitres
CHRC	Central Highlands Regional Council
DWQMP	Drinking Water Quality Management Plan
E. coli	<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
ND	Not Detected
PFAS	Per-fluoroalkyl and poly-fluoroalkyl substances
рН	Power of Hydrogen
QHFSS	Queensland Health Forensic and Scientific Services
R. raciborskii and Cylindro	Raphidiopsis (formerly Cylindrospermopsis) raciborskii, a freshwater cyanobacteria known to produce the toxin cylindrospermopsin and a potential health risk
RMIP	Risk Management Improvement Program
THM	Trihalomethanes
WTP	Water Treatment Plant
>	Greater than
2	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 2020 to 30 June 2021.

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.

Scheme Name	Communities Supplied	Water Source	Treatment Processes	Population Served [#]	Treatment Capacity ML/day
Anakie	Anakie	May Creek Bore	Disinfection	100	0.4
Bauhinia	Bauhinia Downs	Artesian Bore	Disinfection	25	0.1
Dia alamatan	Blackwater	Mashanaia Divan	Coagulation, Filtration, pH	4493	45
Blackwater	Bluff	- Mackenzie River	and Disinfection	247	15
Capella	Capella	Capella Creek / Mackenzie River	Coagulation, Filtration and Disinfection	985	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	182	0.7
Emerald	Emerald	Nogoa River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	14530	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	1173	2.1
Springsure	Springsure	Shallow Basalt / Deeper Sandstone Bores	Aeration and Disinfection	827	2
Tieri	Tieri	Mackenzie River	Coagulation, Filtration, pH correction, Fluoridation and Disinfection	1082	3.6

Table 1 – Summary of water supply schemes

[#] Available populations at July 2021 sourced @

https://www.qgso.qld.gov.au/statistics/theme/population/population-estimates/regions.



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 C. As per section 14 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 updated this reporting period and parameters expanded in some locations. 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.

Additional testing was added to verification monitoring, frequency updated and transition to in house E.Coli testing completed.

3.3 Amendments made to the DWQMP

Following completion of CHRC's first DWQMP review in January 2020, an application for approval to amend the DWQMP was made in February 2020.

A notice of decision from the Regulator was received on 10 August 2020, advising CHRC's application for amendment had been approved.

(Note: a full outline of all items included in the amendment were listed in the 2019-2020 DWQMP Annual Report).



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 2020 to 30 June 2021. The water quality monitoring program was generally carried out as per Section 13 of the approved Central Highlands Regional Council overarching volume of the DWQMP. A small number of samples were collected but did not arrive at Queensland Government Forensic and Scientific Services laboratory for analysis, due to loss of eskies by the courier company engaged for delivery.

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 previously identified and completed in the risk management improvement program.

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 former *Public Health Regulation 2005 and the current Public Health Regulation 2018*. Appendix A (Tables 4.1 to 4.14) 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.

Aesthetic exceedances like pH, sodium and dissolved solids in Springsure and Rolleston, and total hardness in Anakie, Sapphire and Rubyvale were recorded with actions and projects implemented or being considered to make improvements in those areas.

A number of isolated high turbidity events lead to boil water alerts in Duaringa, Rolleston and Emerald. Details of these events are discussed in the next section of this report.

Appendix B (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*, a number of schemes did have recorded result/s for coliforms. We observe, monitor, resample and investigate as required positive coliform occurrences.

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 Rolleston scheme. 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 were five incidents where the regulator was notified under sections 102 or 102A of the Act. These notifications 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 notifications were all related to high turbidity events at each location.

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

No non-compliances with the water quality criteria were required to be reported to the regulator during this reporting period.

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

Three of the five incidents in table 2 required council to issue a 'boil water alert' to the public in Duaringa, Rolleston (incident on 25/01/2021) and Emerald. Once subsequent sampling and retesting results indicated the water quality was back in compliance, boil water alerts were then cancelled.

Incident date	Scheme	Parameter	Level reported µg/L	Health Value* µg/L	Corrective and Preventive actions
25/11/2020	Dingo	Turbidity	N/A	N/A	An overnight storm led to a power failure and breakdown of the coagulant dosing pump. The resultant turbidity spike was followed by 4 days of continuous sampling and testing of water quality. A new dosing pump was purchased, and no subsequent occurrences have been recorded in the scheme monitoring to date. DWI-481-20-08707
16/12/2020	Duaringa	Turbidity	N/A	N/A	Variance in the raw water flow impacted coagulant dosing, leading to a build-up of coagulant blocking the filter. As a result of high turbidity in the reticulation network, a <u>boil water</u> <u>alert</u> was issued. Continuous sampling and testing of water quality was undertaken for 3 days until cancellation of the boil water alert. Foot valves were replaced on both raw water pumps to assist flow regulation and an ultra- filtration membrane plant installed in Q1 2021. DWI-481-20-08741
16/12/2020	Rolleston	Turbidity	N/A	N/A	A sporadic variance in raw water inflow compromised the treatment process and increased turbidity. A manual valve on the raw water pump was adjusted to stem the increased flow, whilst continuous sampling and testing of water quality occurred. Investigation of an ultra-filtration membrane plant was undertaken. DWI-481-20-08742

Table 2 – Prescribed incidents or events reported to the regulator



Incident date	Scheme	Parameter	Level reported µg/L	Health Value* µg/L	Corrective and Preventive actions
25/01/2021	Rolleston	Turbidity	N/A	N/A	Failure on the automatic backwash process resulted in high turbidity in the reticulation network. Investigation found filter media in the final water tank and a <i>boil water alert</i> was put in place for 7 days. Continuous sampling and testing of water quality occurred, the sand filter was bypassed indefinitely, and an ultra-filtration membrane plant installed. DWI-481-21-08856
21/06/2021	Emerald	Turbidity	N/A	N/A	A water main break resulted in an unplanned water outage affecting ~8000 people. The broken section was replaced, and water supply restored. A <i>boil water alert</i> remained in place for 2 days while sampling and testing occurred to monitor water quality. Extensive flushing was undertaken to ensure clean water throughout the network. DWI-481-21-08994



6 Customer Complaints

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.

Scheme	Health Concern	Dirty water	Taste and Odour	Other	Total
Anakie					0
Bauhinia					0
Blackwater/Bluff		5 (1.05)			5 (1.05)
Capella					0
Comet					0
Dingo		1 (6.9)			1 (6.9)
Duaringa					0
Emerald		13 (0.9)	2 (0.14)		15 (1.03)
Rolleston		1 (3.9)			1 (3.9)
Sapphire/Rubyvale					0
Springsure		1 (1.2)	1 (1.2)		2 (2.4)
Tieri		2 (1.8)	1 (0.9)		3 (2.7)
Total	0	23 (0.95)	4 (0.17)	0	27 (1.12)

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

* 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 27 applicable records that total the 27 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. As 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 and/or for the presence of *E. coli.* and a standard water analysis as required.

During the 2020-2021 financial year council is not aware of any confirmed cases of illness arising from the water supply system. Zero complaints were received between July 2020 and June 2021 regarding illness.

6.2 Dirty Water

A total of 23 customer complaints associated with dirty water were received between July 2020 and June 2021.

The town of Emerald reported thirteen of these complaints. Four of these related to black particles in the water, all at differing times, November, March, April and May. Grab samples from complainant households were sent for analysis but did not identity a potential cause. Testing results at the time indicated no parameters exceeded the ADWG guidelines. Filters were changed, lines flushed and there has not been a reoccurrence since the last report in May 2021.

Contractors working on mains in Emerald resulted in two complaints in the same street in June 2021. Lines were flushed until clear which resolved the issue. Two further instances were found to be the result of internal plumbing issues within the customer's house.

In Blackwater, three complaints were all made on the same day in May 2021 following repairs to the network. Again, lines were flushed until clear which resolved the problem.

Two complaints came from the community of Tieri in January 2021. Council investigated the situation and found a valve and hydrant replacement project was the cause of dirty water within the network. The network was flushed, and the issue was promptly resolved.

Each complaint relating to discoloured water or unusual water appearance is investigated by Council. 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. Many of the complaints received are 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 is 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 is 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 or unusual water appearance and are requested to allow the main a short period of time to settle.



6.3 Taste and Odour

A total of 4 customer complaints associated with taste and odour were received between July 2020 and June 2021.

The four complaints received were isolated, unrelated incidents. Lines were flushed, resolving the issue for one customer in Emerald. On two occasions, one in Emerald and another in Tieri, a general overview explaining the water treatment process, disinfection procedures and water quality sampling regime provided a satisfactory outcome to both complainants.

6.4 Other

During the 2020-2021 financial year council did not receive any complaints about 'other' water quality issues.

7 DWQMP Review Outcomes

The next regular review of CHRC's DWQMP is due for completion in November 2021.

CHRC will utilise the DWQMP review prompts from the Drinking Water Quality Management Plan Review and Audit Guideline (2019), as well as expertise and practical field experience to facilitate and structure the review to capture all relevant and necessary requirements.

Following completion of the DWQMP review, an application for approval to amend the DWQMP may be made to the regulator.

8 DWQMP Audit Findings

No audit was conducted during the reporting period of 01/07/2020 to 30/06/2021.

Findings from the DWQMP regulatory audit 2018, will continue to be considered during the next DWQMP review.



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 former *Public Health Regulation 2005 and the current Public Health Regulation 2018.* While all samples taken tested negative for *E. coli*, a number of schemes did have recorded result/s for coliforms. Most physicochemical drinking water quality results from the standard monitoring program met the recommended health value ranges in the ADWG.

Other aesthetic exceedances like pH, sodium and dissolved solids in Springsure and Rolleston and total hardness in Anakie, Sapphire and Rubyvale were recorded with actions and projects implemented or being considered to make improvements in those areas.

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Monthly	12	0	1.19	1.64	1.36	0.01
Scheme name		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Coliforms	CFU/100mL	Monthly	12	1	0	1	0	0
		Trihalomethanes	µg/L	Seasonal/Event	1	0	4	4	4	
		Conductivity	µs/cm	Monthly	12	No value	690	700	695	1
		рН	at 22°C	Monthly	12	0	6.91	7.59	7.30	0.01
		Total Hardness	mg CaC03/L	Monthly	12	12	226	235	230	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	280	290	286	1
	Reticulation	Silica	mg/L	Monthly	12	0	46	49	48	1
		Dissolved Solids	mg/L	Monthly	12	0	420	430	427	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	2	<1	1
Anakia		Sodium	mg/L	Monthly	12	0	63	67	65	1
Anakie		Potassium	mg/L	Monthly	12	No value	1.2	1.3	1.26	0.1
		Calcium	mg/L	Monthly	12	No value	40	42	40.5	0.1
		Magnesium	mg/L	Monthly	12	No value	31	32	31.25	0.1
		Chloride	mg/L	Monthly	12	0	48	49	49	1
		Fluoride	mg/L	Monthly	12	0	0.22	0.23	0.23	0.01
		Nitrate	mg/L	Monthly	12	0	<0.06	<0.09	<0.07	0.5
		Sulphate	mg/L	Monthly	12	0	20	20	20	0.1
		Iron	mg/L	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.018	0.0024	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.02	0.05	0.044	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.01	0.0084	0.03

 Table 4.1 to 4.14 – Verification monitoring results

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Monthly	12	0	0.04	2.6	1.08	0.01
Scheme name		Coliforms	CFU/100mL	Monthly	11	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	11	0	0	0	0	0
		Trihalomethanes	µg/L	Seasonal/Event	1	0	4	4	4	
		Conductivity	us/cm	Monthly	11	No value	456	473	463	1
		рН	mg/L	Monthly	11	0	7.26	8.15	7.69	0.01
		Total Hardness	mg CaC03/L	Monthly	11	0	51	64	57	1
		Alkalinity	mg CaC03/L	Monthly	11	No value	158	170	164	1
		Silica	mg/L	Monthly	11	0	18	19	18	1
	Reticulation	Dissolved Solids	mg/L	Monthly	11	0	266	277	271	1
		True Colour	hazen	Monthly	11	0	<1	8	6	1
		Turbidity	NTU	Monthly	11	0	<1	5	1	1
Poubinio		Sodium	mg/L	Monthly	11	0	62	72	67	1
Dauriinia		Potassium	mg/L	Monthly	11	No value	20	22	20.6	0.1
		Calcium	mg/L	Monthly	11	No value	9.4	13	11	0.1
		Magnesium	mg/L	Monthly	11	No value	6.7	7.6	7.1	0.1
		Chloride	mg/L	Monthly	11	0	45	51	48	1
		Fluoride	mg/L	Monthly	11	0	0.16	0.17	0.17	0.01
		Nitrate	mg/L	Monthly	11	0	<0.1	0.36	0.16	0.5
		Sulphate	mg/L	Monthly	11	0	0.2	0.4	0.3	0.1
		Iron	mg/l	Monthly	11	0	<0.01	0.09	0.03	0.01
		Manganese	mg/L	Monthly	11	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	11	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	11	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	11	0	0.03	0.04	0.04	0.01
		Copper	mg/L	Monthly	11	0	0.003	0.009	0.0041	0.03



Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Weekly	52	0	0.19	1.39	0.83	0.01
Scheme name Blackwater		Coliforms	CFU/100mL	Weekly	52	0	0	0	0	0
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0
		Trihalomethanes	μg/L	Seasonal/Event	8	0	68	190	120	1
		Conductivity	us/cm	Monthly	12	No value	220	440	291	1
		рН	mg/L	Monthly	12	0	6.53	7.83	7.25	0.01
		Total Hardness	mg CaC03/L	Monthly	12	0	56	120	82	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	50	107	77	1
		Silica	mg/L	Monthly	12	0	9	15	12	1
	Reticulation	Dissolved Solids	mg/L	Monthly	12	0	130	239	165	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
		Sodium	mg/L	Monthly	12	0	16	40	24	1
Blackwater		Potassium	mg/L	Monthly	12	No value	4.8	5.9	5.16	0.1
		Calcium	mg/L	Monthly	12	No value	14	29	19.75	0.1
		Magnesium	mg/L	Monthly	12	No value	4.8	12	7.87	0.1
		Chloride	mg/L	Monthly	12	0	22	58	35	1
		Fluoride	mg/L	Monthly	12	0	0.10	0.69	0.49	0.01
		Nitrate	mg/L	Monthly	12	0	<0.1	0.97	0.41	0.5
		Sulphate	mg/L	Monthly	12	0	7.7	20	14.4	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.06	0.04	0.05
		Boron	mg/L	Monthly	12	0	0.03	0.05	0.04	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.003	0.003	0.03
	Raw Water	Ecoli	CFU/100mL		52	NA	0	610	76	0

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
	Reticulation	Chlorine (Free)	mg/L	Monthly	12	0	0.67	1.68	1.05	0.01
Bluff		Coliforms	CFU/100mL	Monthly	11	1	0	1	0	0
		Ecoli	CFU/100mL	Monthly	11	0	0	0	0	0
		Trihalomethanes	μg/L	Seasonal/Event	8	0	95	220	143	1

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Monthly	51	0	0.29	0.98	0.67	0.01
		Coliforms	CFU/100mL	Monthly	51	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	51	0	0	0	0	0
		Trihalomethanes	μg/L	Seasonal/Event	8	0	69	96	88	1
		Conductivity	us/cm	Monthly	12	No value	313	502	406	1
		рН	mg/L	Monthly	12	0	6.93	7.68	7.35	0.01
		Total Hardness	mg CaC03/L	Monthly	12	0	74	132	102	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	95	151	128	1
		Silica	mg/L	Monthly	12	0	12	13	13	1
		Dissolved Solids	mg/L	Monthly	12	0	184	296	240	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
	Deticulation	Sodium	mg/L	Monthly	12	0	38	59	47	1
Canalla	Reticulation	Potassium	mg/L	Monthly	12	No value	2.6	3.6	3.1	0.1
Capella		Calcium	mg/L	Monthly	12	No value	18	28	23.2	0.1
		Magnesium	mg/L	Monthly	12	No value	6.9	15	10.6	0.1
		Chloride	mg/L	Monthly	12	0	22	59	30	1
		Fluoride	mg/L	Monthly	12	0	0.14	0.31	0.23	0.01
		Nitrate	mg/L	Monthly	12	0	0.06	0.51	0.23	0.5
		Sulphate	mg/L	Monthly	12	0	3.7	63	39.2	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.06	0.042	0.05
		Boron	mg/L	Monthly	12	0	0.08	0.14	0.11	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.013	0.008	0.03
	Raw Water	Ecoli	CFU/100mL		45	NA	0	21	3	0
		Algae (pot. toxic)	Cells/mL	Seasonally	7	No value	35	7100	1349	1



Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Monthly	12	0	0.35	2.02	1.04	0.01
		Coliforms	CFU/100mL	Monthly	12	1	0	1	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Trihalomethanes	µg/L	Seasonal/Event	8	0	110	230	165	1
		Conductivity	us/cm	Monthly	12	No value	210	285	250	1
		рН	mg/L	Monthly	12	0	6.93	8.22	7.55	0.01
		Total Hardness	mg CaC03/L	Monthly	12	0	63	105	85	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	71	125	102	1
		Silica	mg/L	Monthly	12	0	6	22	15	1
		Dissolved Solids	mg/L	Monthly	12	0	115	170	147	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	4	<1	1
Comet	Reticulation	Sodium	mg/L	Monthly	12	0	14	18	16	1
Comet	Reliculation	Potassium	mg/L	Monthly	12	No value	4.7	8.4	6.14	0.1
		Calcium	mg/L	Monthly	12	No value	15	24	19.5	0.1
		Magnesium	mg/L	Monthly	12	No value	5.6	11	8.72	0.1
		Chloride	mg/L	Monthly	12	0	14	24	18	1
		Fluoride	mg/L	Monthly	12	0	0.11	0.29	0.15	0.01
		Nitrate	mg/L	Monthly	12	0	<0.1	0.96	0.38	0.5
		Sulphate	mg/L	Monthly	12	0	0.3	4.1	1.76	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.02	0.05	0.03	0.01
		Copper	mg/L	Monthly	12	0	0.007	0.015	0.009	0.03

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Monthly	12	0	0.65	1.52	0.97	0.01
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Trihalomethanes	µg/L	Seasonally	8	0	93	150	133	1
		Conductivity	us/cm	Monthly	12	No value	139	152	144	1
		рН	mg/L	Monthly	12	0	6.56	7.57	6.84	0.01
		Total Hardness	mg CaC03/L	Monthly	12	0	28	33	30	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	39	48	44	1
		Silica	mg/L	Monthly	12	0	11	12	12	1
		Dissolved Solids	mg/L	Monthly	12	0	82	90	86	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	2	<1	1
	Poticulation	Sodium	mg/L	Monthly	12	0	14	17	15	1
Dingo	Reliculation	Potassium	mg/L	Monthly	12	No value	3.4	4.0	3.7	0.1
		Calcium	mg/L	Monthly	12	No value	5.2	6.5	6.1	0.1
		Magnesium	mg/L	Monthly	12	No value	3.3	4.1	3.7	0.1
		Chloride	mg/L	Monthly	12	0	15	19	17	1
		Fluoride	mg/L	Monthly	12	0	0.012	0.14	0.12	0.01
		Nitrate	mg/L	Monthly	12	0	0.17	0.49	0.33	0.5
		Sulphate	mg/L	Monthly	12	0	1.3	1.8	1.5	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.05	0.06	0.055	0.01

	Copper	mg/L	Monthly	12	0	0.003	0.005	0.003	0.03
Raw Water	Ecoli	CFU/100mL		5	NA	2	71	17	0



Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Monthly	12	0	0.11	1.94	1.26	0.01
		Coliforms	CFU/100mL	Monthly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
		Trihalomethanes	µg/L	Seasonally	6	0	93	190	130	1
		Conductivity	us/cm	Monthly	12	No value	190	280	230	1
		рН	mg/L	Monthly	12	0	6.72	7.93	7.13	0.01
		Total Hardness	mg CaC03/L	Monthly	12	0	45	81	59	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	65	105	81	1
		Silica	mg/L	Monthly	12	0	10	16	14	1
		Dissolved Solids	mg/L	Monthly	12	0	120	168	138	1
		True Colour	hazen	Monthly	12	0	2	10	7	1
		Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
	Poticulation	Sodium	mg/L	Monthly	12	0	18	25	21	1
Duoringo	Reliculation	Potassium	mg/L	Monthly	12	No value	5.5	7.3	6.1	0.1
Duannga		Calcium	mg/L	Monthly	12	No value	12	21	15.7	0.1
		Magnesium	mg/L	Monthly	12	No value	3.8	6.8	4.9	0.1
		Chloride	mg/L	Monthly	12	0	18	25	20	1
		Fluoride	mg/L	Monthly	12	0	0.13	0.20	0.15	0.01
		Nitrate	mg/L	Monthly	12	0	0.32	1.4	0.85	0.5
		Sulphate	mg/L	Monthly	12	0	3.2	7.9	5.5	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.004	0.002	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.03	0.05	0.04	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.009	0.006	0.03
	Bow Motor	Ecoli	CFU/100mL		5	NA	0	370	213	0
	Raw Water	Algae (pot. toxic)	Cells/mL	Seasonally	2	No value	735	3500	2118	1

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Weekly	104	0	0.45	2.20	1.20	0.01
		Coliforms	CFU/100mL	Weekly	104	0	0	2	0	0
		Ecoli	CFU/100mL	Weekly	104	0	0	0	0	0
		Trihalomethanes	μg/L	Seasonally	1	0	69	69	69	1
		Conductivity	us/cm	Monthly	24	No value	220	476	349	1
		рН	mg/L	Monthly	24	0	6.62	8.02	7.43	0.01
		Total Hardness	mg CaC03/L	Monthly	24	0	65	141	104	1
		Alkalinity	mg CaC03/L	Monthly	24	No value	77	169	124	1
		Silica	mg/L	Monthly	24	0	6	11	9.2	1
		Dissolved Solids	mg/L	Monthly	24	0	130	261	195	1
		True Colour	hazen	Monthly	24	0	<1	8	6	1
		Turbidity	NTU	Monthly	24	0	<1	<1	<1	1
	Poticulation	Sodium	mg/L	Monthly	24	0	16	40	27	1
Emerald	Reliculation	Potassium	mg/L	Monthly	24	No value	7.5	11	9	0.1
		Calcium	mg/L	Monthly	24	No value	16	34	25	0.1
		Magnesium	mg/L	Monthly	24	No value	6.2	14	10	0.1
		Chloride	mg/L	Monthly	24	0	20	46	30	1
		Fluoride	mg/L	Monthly	24	0	0.21	0.94	0.66	0.01
		Nitrate	mg/L	Monthly	24	0	0.10	2.0	0.90	0.5
		Sulphate	mg/L	Monthly	24	0	4.3	11	7.6	0.1
		Iron	mg/l	Monthly	24	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	24	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	24	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	24	0	0.03	0.04	0.03	0.05
		Boron	mg/L	Monthly	24	0	0.05	0.09	0.07	0.01
		Copper	mg/L	Monthly	24	0	0.003	0.017	0.009	0.03
	Raw Water	Ecoli	CFU/100mL		89	NA	0	2400	125	0



Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Weekly	12	0	0.58	2.5	1.59	0.01
		Coliforms	CFU/100mL	Weekly	12	0	0	0	0	0
		Ecoli	CFU/100mL	Weekly	12	0	0	0	0	0
		Trihalomethanes	μg/L	Seasonal/Event	8	0	110	210	145	1
		Conductivity	us/cm	Monthly	12	No value	220	1230	374	1
		рН	mg/L	Monthly	12	1	7.06	8.63	7.79	0.01
		Total Hardness	mg CaC03/L	Monthly	12	0	44	90	71	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	74	259	117	1
		Silica	mg/L	Monthly	12	0	9	16	12	1
		Dissolved Solids	mg/L	Monthly	12	1	130	705	212	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
		Sodium	mg/L	Monthly	12	1	18	260	50	1
	Reticulation	Potassium	mg/L	Monthly	12	No value	3.1	6.9	5.6	0.1
Rolleston		Calcium	mg/L	Monthly	12	No value	11	18	15	0.1
		Magnesium	mg/L	Monthly	12	No value	4	11	8.2	0.1
		Chloride	mg/L	Monthly	12	0	15	200	44	1
		Fluoride	mg/L	Monthly	12	0	0.15	0.22	0.19	0.01
		Nitrate	mg/L	Monthly	12	0	<0.1	0.41	0.29	0.5
		Sulphate	mg/L	Monthly	12	0	1.8	60	7.6	0.1
		Iron	mg/l	Monthly	12	0	<0.01	0.014	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.002	0.0011	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.03	0.07	0.043	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.008	0.004	0.03
		Ecoli	CFU/100mL		7	NA	0	4	1	0
	Raw Water	Algae (pot. toxic)	Cells/mL	Seasonally	5	No value	470	14244	4449	1
		Toxin (cylindro)	µg/L	Seasonally	1	No value	40	40	40	0.2

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Weekly	52	0	0.47	1.09	0.80	0.01
		Coliforms	CFU/100mL	Weekly	52	0	0	0	0	0
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	No value	351	687	595	1
		рН	mg/L	Monthly	12	0	6.85	7.89	7.31	0.01
		Total Hardness	mg CaC03/L	Monthly	12	2	181	219	195	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	170	184	176	1
		Silica	mg/L	Monthly	12	0	32	34	33	1
		Dissolved Solids	mg/L	Monthly	12	0	349	398	366	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
		Sodium	mg/L	Monthly	12	0	50	58	53	1
Rubyvale	Reticulation	Potassium	mg/L	Monthly	12	No value	1.3	1.7	1.55	0.1
		Calcium	mg/L	Monthly	12	No value	45	55	49	0.1
		Magnesium	mg/L	Monthly	12	No value	17	20	18	0.1
		Chloride	mg/L	Monthly	12	0	63	88	71	1
		Fluoride	mg/L	Monthly	12	0	0.42	0.85	0.72	0.01
		Nitrate	mg/L	Monthly	12	0	1.9	4.2	3.1	0.5
		Sulphate	mg/L	Monthly	12	0	27	34	30	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.03	0.04	0.03	0.01

		Copper	mg/L	Monthly	12	0	0.045	0.12	0.079	0.03
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Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Weekly	52	0	0.34	1.38	0.92	0.01
		Coliforms	CFU/100mL	Weekly	52	1	0	2	0	0
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0
		Conductivity	us/cm	Monthly	12	No value	584	689	615	1
		рН	mg/L	Monthly	12	0	6.85	8.06	7.37	0.01
		Total Hardness	mg CaC03/L	Monthly	12	3	180	221	194	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	170	183	175	1
		Silica	mg/L	Monthly	12	0	32	34	33	1
		Dissolved Solids	mg/L	Monthly	12	0	348	400	363	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
		Sodium	mg/L	Monthly	12	0	50	52	51	1
Sapphire	Reticulation	Potassium	mg/L	Monthly	12	No value	1.3	1.7	1.5	0.1
		Calcium	mg/L	Monthly	12	No value	45	56	49	0.1
		Magnesium	mg/L	Monthly	12	No value	16	20	18	0.1
		Chloride	mg/L	Monthly	12	0	62	89	71	1
		Fluoride	mg/L	Monthly	12	0	0.25	0.86	0.61	0.01
		Nitrate	mg/L	Monthly	12	0	2.0	4.5	3.2	0.5
		Sulphate	mg/L	Monthly	12	0	27	34	29	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
		Boron	mg/L	Monthly	12	0	0.03	0.04	0.03	0.01
		Copper	mg/L	Monthly	12	0	0.021	0.05	0.032	0.03

Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
		Chlorine (Free)	mg/L	Weekly	52	0	0.27	1.35	0.89	0.01
		Coliforms	CFU/100mL	Weekly	52	1	0	1	0	0
		Ecoli	CFU/100mL	Weekly	52	0	0	0	0	0
		Trihalomethanes	µg/L	Seasonal/ Event	8	0	89	220	161	1
		Conductivity	us/cm	Monthly	12	No value	59	621	424	1
		рН	mg/L	Monthly	12	0	6.74	8.14	7.43	0.01
		Total Hardness	mg CaC03/L	Monthly	12	0	53	134	92	1
		Alkalinity	mg CaC03/L	Monthly	12	No value	78	152	120	1
		Silica	mg/L	Monthly	12	0	10	15	11	1
		Dissolved Solids	mg/L	Monthly	12	0	200	350	273	1
		True Colour	hazen	Monthly	12	0	<1	8	6	1
		Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
Tiori	Deticulation	Sodium	mg/L	Monthly	12	0	46	78	61	1
Tieri	Reticulation	Potassium	mg/L	Monthly	12	No value	4.9	6.2	5.5	0.1
		Calcium	mg/L	Monthly	12	No value	13	31	21	0.1
		Magnesium	mg/L	Monthly	12	No value	4.8	14	9.25	0.1
		Chloride	mg/L	Monthly	12	0	18	72	42	1
		Fluoride	mg/L	Monthly	12	0	0.12	0.66	0.37	0.01
		Nitrate	mg/L	Monthly	12	0	<0.1	0.94	0.43	0.5
		Sulphate	mg/L	Monthly	12	0	45	52	48	0.1
		Iron	mg/l	Monthly	12	0	<0.01	<0.01	<0.01	0.01
		Manganese	mg/L	Monthly	12	0	0.001	0.001	0.001	0.01
		Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
		Aluminium	mg/L	Monthly	12	0	0.03	0.12	0.06	0.05
		Boron	mg/L	Monthly	12	0	0.04	0.05	0.04	0.01
		Copper	mg/L	Monthly	12	0	0.003	0.003	0.003	0.03



Choore (Free) CPU10C0. Monthy 12 0 0.0 0.0 Ecoldores CPU10C0. Monthy 12 0.0 0.0 0.0 0.0 Ecoldores CPU10C0. Monthy 12 0.0 0.0 0.0 0.0 0.0 India Scates mag CaCOL Monthy 12 0.0 4.0 0.0	Scheme name	Scheme component	Parameter	Units	Minimum frequency of sampling	Total No. samples collected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	LOR
Springume Coltornia CPU100mL Moenthy 12 0 0 0 0 Review Devitive Moenthy 112 No vulue 922 970 9877 1 PH mpd Moenthy 122 No vulue 940 448 8.41 0.01 Total Matchess mpG CaCO2L Moenthy 122 0 1.4 8.68 0.01 Stata mpG CaCO2L Moenthy 122 0 2.0 2.0 2.0 1 Distatored Stotis mpL Moenthy 122 0 4.0 8.6 1 Tutal CoCut Inazo O Moenthy 122 1.0 6.0 2.2 2.0 1.3 1.20 1.3 1.0			Chlorine (Free)	mg/L	Monthly	12	0	0.94	1.9	1.40	0.01
Exam CPL/LOOML Moninity 12 No 0 0 0 0 PH mg(L Moninity 12 No 8.27 8.40 8.41 0.01 PH mg(L) Monthity 12 No 8.27 8.40 6.41 0.01 Tablearbeas mg(L) Monthity 12 No 8.00 6.02 5.82 1 Decohed Solds mg(L Monthity 12 0 4.1 4.1 4.1 1 Tue Colour Insam Monthy 12 0 4.1 4.1 4.1 1 Tue Colour mgL Monthy 12 No 4.1 3.0 1.1 Tue Colour mgL Monthy 12 No 4.0 1.3 1.3 3.2 1 Recorde mgL Monthy 12 No 0.01 0.05 0.47 0.31 3.3 3.2 1 Potasian			Coliforms	CFU/100mL	Monthly	12	1	0	2	0	0
Springues Conductivity usion Meenthy 12 No value 922 970 957 1 PH mg Meenthy 12 0 827 849 841 0.01 Total Hardness mg GcG03L Monthy 12 No value 466 447 489 1 Silca mg L Monthy 12 No value 466 602 682 1 Dissolves Goldu mg L Monthy 12 0 41 8 6 1 True Colour mg L Monthy 12 0 41 8 6 1 True Colour mg L Monthy 12 No value 3.6 4.1 3.8 0.1 Conne mg L Monthy 12 No value 3.6 0.5 0.01 Magessin mg L Monthy 12 0 0.45 0.00 0.01 0.02 0.01 0.02 0.01 0.02 </td <td></td> <td></td> <td>Ecoli</td> <td>CFU/100mL</td> <td>Monthly</td> <td>12</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>			Ecoli	CFU/100mL	Monthly	12	0	0	0	0	0
ph mg.L Monthy 12 0 8.7 8.48 0.01 Norabi mg.Gc.30.L Monthy 12 0 14 16 15 1 Name mg.Gc.30.L Monthy 12 0 20 22 21 1 Siles mg.L Monthy 12 0 20 22 21 1 Siles mg.L Monthy 12 0 <1			Conductivity	us/cm	Monthly	12	No value	922	970	957	1
Springare Total Hardwess mg GaC033L Menthy 12 00 value 48 16 15 1 Alkaininy mg GaC033L Monthy 12 00 value 496 497 489 1 Biso mg1L Monthy 12 0 20 22 21 1 Dissolved Solds mg1L Monthy 12 0 <11			pH	mg/L	Monthly	12	0	8.27	8.49	8.41	0.01
Result Allalinity mg_CaC03L Monthy 12 No value 468 447 689 1 Slica mgL Monthy 12 0 0 22 21 1 Desolved Solds mgL Monthy 12 0 -1 8 6 1 Turbidy NTU Monthy 12 0 -1 8 6 1 Turbidy NTU Monthy 12 No value 3.6 4.2 3.8 0.1 Sodum mgL Monthy 12 No value 3.5 4.2 3.8 0.1 Choinia mgL Monthy 12 No value 3.5 4.2 3.8 0.1 Choinia mgL Monthy 12 No value 3.5 4.1 3.8 0.1 Silphate mgL Monthy 12 0 0.26 0.06 0.06 0.06 0.06 0.01 0.01 1.1			Total Hardness	mg CaC03/L	Monthly	12	0	14	16	15	1
Springsure Sizia mgL Moenthy 12 0 20 22 21 1 Dissolved Solids mgL Moenthy 12 0 -(1 88 6 1 True Colour hazen Moenthy 12 0 -(1 8 6 1 True Colour hazen Moenthy 12 0 -(1 4 -(1 -(1 1 1 Godium mgL Moenthy 12 No value 3.8 4.1 3.8 0.1 Calcium mgL Moenthy 12 No value 3.8 4.2 3.8 0.1 Magnessium mgL Moenthy 12 0 0.45 0.50 0.47 0.01 Nitrate mgL Moenthy 12 0 0.22 1.8 0.36 0.01 Manaparese mgL Moenthy 12 0 0.03 0.03 0.03 0.03 0.03 0.03 </td <td></td> <td></td> <td>Alkalinity</td> <td>mg CaC03/L</td> <td>Monthly</td> <td>12</td> <td>No value</td> <td>466</td> <td>497</td> <td>489</td> <td>1</td>			Alkalinity	mg CaC03/L	Monthly	12	No value	466	497	489	1
Springsure Diss/vert Solids mgl. Monthly 12 1 590 602 592 1 True Calour hazen Monthly 12 0 8 6 1 Ruppering Numbity NTU Monthly 12 0 1<			Silica	mg/L	Monthly	12	0	20	22	21	1
Properior Truckoling Turbickij NTU Monthy 12 0 <1 8 6 1 Sodium mgL Monthy 12 0 <1			Dissolved Solids	mg/L	Monthly	12	1	560	602	592	1
Springsue Turbeily Sodum NTU Monthy 12 10 <1 <1 1 Sodum mgL Monthy 12 12 20 240 228 1 Prasaium mgL Monthy 12 No value 3.6 4.1 3.9 0.1 Magnesium mgL Monthy 12 No value 3.6 4.2 3.8 0.1 Magnesium mgL Monthy 12 No value 3.6 4.2 3.8 0.1 Chordia mgL Monthy 12 0 3.1 3.3 3.2 1 Fluoridie mgL Monthy 12 0 0.29 0.9 0.38 0.5 Suphale mgL Monthy 12 0 0.01 0.00 0.01 0.01 0.00 0.01 0.01 0.01 0.01 0.01 0.01 0.00 0.01 0.01 0.00 0.01 0.01 0.00			True Colour	hazen	Monthly	12	0	<1	8	6	1
Upper Some Some Some Sodum mpL Monthy 12 12 200 240 236 1 Potassium mpL Monthy 12 No value 3.8 4.1 3.8 0.1 Calcium mpL Monthy 12 No value 3.6 4.2 3.8 0.1 Magnesium mpL Monthy 12 No value 1.2 1.3 1.28 0.1 Magnesium mpL Monthy 12 0 0.45 0.50 0.47 0.01 Nitate mpL Monthy 12 0 0.45 0.50 0.01 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.011 0.011 0.011 <td></td> <td></td> <td>Turbidity</td> <td>NTU</td> <td>Monthly</td> <td>12</td> <td>0</td> <td><1</td> <td><1</td> <td><1</td> <td>1</td>			Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
Reliculation Zone SG Petassium mg/L Monthy 12 No value 3.8 4.1 3.9 0.1 Galcium mg/L Monthy 12 No value 3.5 4.2 3.8 0.1 Magnesium mg/L Monthy 12 No value 3.5 4.2 3.8 0.1 Choride mg/L Monthy 12 0 0.45 0.50 0.47 0.01 Fluoride mg/L Monthy 12 0 0.45 0.36 0.65 Sulphate mg/L Monthy 12 0 0.01 0.002 0.031 0.03 0.03 0.01 0.01 Marganese mg/L Monthy 12 0 0.06 0.06 0.01 0.01 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.01 0 <td></td> <td>Upper</td> <td>Sodium</td> <td>mg/L</td> <td>Monthly</td> <td>12</td> <td>12</td> <td>220</td> <td>240</td> <td>236</td> <td>1</td>		Upper	Sodium	mg/L	Monthly	12	12	220	240	236	1
Springsue Context Magnesium mgL Monthy 12 No value 3.5 4.2 3.8 0.1 Magnesium mgL Monthy 12 No value 1.2 1.3 1.28 0.1 Chiotide mgL Monthy 12 0 0.45 0.50 0.47 0.01 Nation mgL Monthy 12 0 0.45 0.50 0.47 0.01 Nation mgL Monthy 12 0 0.42 1.8 0.38 0.1 Iron mgL Monthy 12 0 0.02 0.08 0.06 0.01 0.		Reticulation	Potassium	mg/L	Monthly	12	No value	3.8	4.1	3.9	0.1
Springsure Magnesium mg/L Monthy 12 No value 1.2 1.3 1.28 0.1 Chloride mg/L Monthy 12 0 3.1 3.3 3.2 1 Fluoride mg/L Monthy 12 0 0.45 0.50 0.47 0.011 Nirate mg/L Monthy 12 0 0.29 0.9 0.36 0.5 Sulphate mg/L Monthy 12 0 0.01 0.08 0.06 0.011 Iron mg/L Monthy 12 0 0.06 0.066 0.011 Auminium mg/L Monthy 12 0 0.06 0.083 0.033 0.033 0.033 0.03<		∠one SG	Calcium	mg/L	Monthly	12	No value	3.5	4.2	3.8	0.1
Springsue Choride mg/L Monthy 12 0 31 33 32 1 Fluoride mg/L Monthy 12 0 0.45 0.50 0.47 0.01 Nitrate mg/L Monthy 12 0 0.29 0.98 0.36 0.55 Sulphate mg/L Monthy 12 0 0.01 0.08 0.06 0.06 0.06 0.06 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.00 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.01 0.03 0.04			Magnesium	mg/L	Monthly	12	No value	1.2	1.3	1.28	0.1
Fluaride mg/L Monthy 12 0 0.45 0.50 0.47 0.01 Nitrate mg/L Monthy 12 0 0.29 0.9 0.36 0.5 Sulphate mg/L Monthy 12 0 0.21 1.8 0.38 0.11 Iron mg/L Monthy 12 0 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.002 0.001 0.001 0.001 0.001 0.011 0			Chloride	mg/L	Monthly	12	0	31	33	32	1
Springsure Nitrate mg/L Monthy 12 0 0.29 0.9 0.36 0.5 Suphate mg/L Monthy 12 0 0.2 1.8 0.38 0.1 Iron mg/L Monthy 12 0 0.01 0.08 0.06 0.01 Manpanese mg/L Monthy 12 0 0.03 0.03 0.03 0.03 0.03 0.05 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.06 0.03 0.13 <td></td> <td></td> <td>Fluoride</td> <td>mg/L</td> <td>Monthly</td> <td>12</td> <td>0</td> <td>0.45</td> <td>0.50</td> <td>0.47</td> <td>0.01</td>			Fluoride	mg/L	Monthly	12	0	0.45	0.50	0.47	0.01
Springsure Sulphate mg/L Monthly 12 0 0.2 1.8 0.38 0.1 Iron mg/L Monthly 12 0 -0.01 0.08 0.06 0.01 Manganese mg/L Monthly 12 0 0.061 0.001 0.001 0.001 0.001 0.011 0.011 Zinc mg/L Monthly 12 0 0.06 0.06 0.06 0.011 Aluminium mg/L Monthly 12 0 0.03			Nitrate	mg/L	Monthly	12	0	0.29	0.9	0.36	0.5
Iton mg1 Monthly 12 0 4.0.01 0.08 0.06 0.01 Manganese mgL Monthly 12 0 0.001 0.002 0.0011 0.01 Zince mgL Monthly 12 0 0.06 0.06 0.06 0.06 0.06 0.01 0.03 0.			Sulphate	mg/L	Monthly	12	0	0.2	1.8	0.38	0.1
Springsure Manganese mg/L Monthy 12 0 0.001 0.002 0.0011 0.011 Zinc mg/L Monthy 12 0 0.066 0.066 0.06 0.016 0.011 0.011 Aluminium mg/L Monthy 12 0 0.033 0.033 0.030 0.055 Boron mg/L Monthy 12 0 0.16 0.18 0.17 0.011 Copper mg/L Monthy 12 0 0.003 0.009 0.039 0.033 Choine (Free) mg/L Monthy 12 0 1.21 1.88 1.54 0.011 Colidoms CFU/100mL Monthy 12 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1100 1139 1 1 1 0 14 39 29 1 1 1 1			Iron	ma/l	Monthly	12	0	<0.01	0.08	0.06	0.01
Springsure Zinc mg/L Monthly 12 0 0.06 0.06 0.06 0.01 Aluminium mg/L Monthly 12 0 0.03 0.03 0.03 0.05 Boron mg/L Monthly 12 0 0.16 0.18 0.17 0.01 Copper mg/L Monthly 12 0 0.03 0.03 0.03 Chorine (Free) mg/L Monthly 12 0 1.21 1.88 1.54 0.01 Coliforms CFU/100mL Monthly 12 0			Manganese	mg/L	Monthly	12	0	0.001	0.002	0.0011	0.01
Aluminium mg/L Monthly 12 0 0.03			Zinc	mg/L	Monthly	12	0	0.06	0.06	0.06	0.01
Boron mg/L Monthy 12 0 0.16 0.18 0.17 0.01 Copper mg/L Monthy 12 0 0.003 0.009 0.039 0.03 Springsure Chlorine (Free) mg/L Monthy 12 0 1.21 1.88 1.54 0.01 Collforms CFU/100mL Monthy 12 0 0 21 2 0 0 Ecoll CFU/100mL Monthy 12 No value 1100 1200 1139 1 pH mg/L Monthy 12 No value 18.49 8.39 0.01 Total Hardness mg/L Monthy 12 0 14 39 29 1 Silica mg/L Monthy 12 0 14 39 29 1 Silica mg/L Monthy 12 0 14 39 29 1 Silica mg/L Monthy<			Aluminium	mg/L	Monthly	12	0	0.03	0.03	0.03	0.05
Springsure Copper mg/L Monthly 12 0 0.03 0.009 0.033 0.03 Springsure Chlorine (Free) mg/L Monthly 12 0 1.21 1.88 1.54 0.01 Coliforms CFU/100nL Monthly 12 0 0 21 2 0 Ecoli CFU/100nL Monthly 12 0 <			Boron	mg/L	Monthly	12	0	0.16	0.18	0.17	0.01
Springsure Dage Monthy 12 Out Date Out			Copper	mg/L	Monthly	12	0	0.003	0.009	0.0039	0.03
Lower WH Colliforms CFU/100mL Monthly 12 0 0 21 2 0 Lower WH Colliforms CFU/100mL Monthly 12 0 </td <td>Springsure</td> <td></td> <td>Chlorine (Free)</td> <td>mg/L</td> <td>Monthly</td> <td>12</td> <td>0</td> <td>1.21</td> <td>1.88</td> <td>1.54</td> <td>0.01</td>	Springsure		Chlorine (Free)	mg/L	Monthly	12	0	1.21	1.88	1.54	0.01
Lower WH Ecoli CFU/100mL Monthly 12 0<			Coliforms	CFU/100ml	Monthly	12	0	0	21	2	0
Lower Reticulation OVE Conductivity us/cm Monthly 12 No value 100 1200 1139 1 Lower Reticulation OVH Marking mg/L Monthly 12 0 8.31 8.49 8.39 0.01 Lower Reticulation OVH Total Hardness mg/L Monthly 12 0 14 39 29 1 Alkalinity mg/L Monthly 12 0 17 22 2.0 1 Silica mg/L Monthly 12 0 17 22 2.0 1 Dissolved Solids mg/L Monthly 12 0 <1			Ecoli	CFU/100ml	Monthly	12	0	0	0	0	0
PH mg/L Monthly 12 0.0 8.31 8.49 8.39 0.01 Total Hardness mg CaC03/L Monthly 12 0 14 39 29 1 Alkalinity mg CaC03/L Monthly 12 0 14 39 29 1 Alkalinity mg CaC03/L Monthly 12 0 17 22 20 1 Silica mg/L Monthly 12 0 17 22 20 1 Dissolved Solids mg/L Monthly 12 0 <1			Conductivity	us/cm	Monthly	12	No value	1100	1200	1139	1
Lower Reticulation Zone WH Image CaC03/L Monthly Monthly 12 12 Out Ou			pH	ma/l	Monthly	12	0	8.31	8.49	8.39	0.01
Lower No			Total Hardness	mg CaC03/I	Monthly	12	0	14	39	29	1
Lower Reticulation Zone WH Instanty Instanty Instanty Instanty			Alkalinity	mg CaC03/L	Monthly	12	No value	585	600	590	1
Lower Imple Monthly 12 12 695 720 705 1 True Colour hazen Monthly 12 0 <1			Silica	mg/l	Monthly	12	0	17	22	20	1
Lower Reticulation Zone WH True Colour hazen NUTU Monthly 12 0 <1 8 66 1 Muthy NTU Monthly 12 0 <1			Dissolved Solids	mg/L	Monthly	12	12	695	720	705	1
Lower Reticulation Zone WH Turbidity Sodium NTU Monthy 12 0 -1 <1 <1 1 Potassium mg/L Monthly 12 12 270 290 280 1 Potassium mg/L Monthly 12 No value 3.6 4.3 4.05 0.1 Calcium mg/L Monthly 12 No value 3.9 7.8 6.2 0.1 Magnesium mg/L Monthly 12 No value 3.9 7.8 6.2 0.1 Chloride mg/L Monthly 12 No value 1.1 4.7 3.4 0.1 Chloride mg/L Monthly 12 0 3.6 40 3.8 1 Fluoride mg/L Monthly 12 0 0.34 0.36 0.34 0.01 Nitrate mg/L Monthly 12 0 0.01 0.05 0.03 0.01 Manganese			True Colour	hazen	Monthly	12	0	<1	8	6	1
Lower Reticulation Zone WH Sodium mg/L Monthly 12 12 270 290 280 1 WH Potassium mg/L Monthly 12 No value 3.6 4.3 4.05 0.1 WH Potassium mg/L Monthly 12 No value 3.6 4.3 4.05 0.1 Galcium mg/L Monthly 12 No value 3.9 7.8 6.2 0.1 Magnesium mg/L Monthly 12 No value 1.1 4.7 3.4 0.1 Chloride mg/L Monthly 12 0 36 40 38 1 Fluoride mg/L Monthly 12 0 0.34 0.36 0.34 0.01 Nitrate mg/L Monthly 12 0 0.2 1.2 0.81 0.1 Iron mg/L Monthly 12 0 0.02 0.0015 0.01			Turbidity	NTU	Monthly	12	0	<1	<1	<1	1
Reticulation Zone WH Potassium mg/L Monthly 12 No value 3.6 4.3 4.05 0.1 Main mg/L Monthly 12 No value 3.6 4.3 4.05 0.1 Calcium mg/L Monthly 12 No value 3.9 7.8 6.2 0.1 Magnesium mg/L Monthly 12 No value 1.1 4.7 3.4 0.1 Chloride mg/L Monthly 12 0 36 40 38 1 Fluoride mg/L Monthly 12 0 0.34 0.36 0.34 0.01 Nitrate mg/L Monthly 12 0 0.23 0.26 0.24 0.5 Sulphate mg/L Monthly 12 0 0.23 0.26 0.03 0.01 Iron mg/L Monthly 12 0 0.01 0.002 0.03 0.01 Zinc		Lower	Sodium	mg/l	Monthly	12	12	270	290	280	1
Zone WH Notable No table <		Reticulation	Potassium	mg/L	Monthly	12	No value	3.6	4.3	4.05	0.1
Min Ingre Monthly 12 No value 1.1 4.7 3.4 0.1 Magnesium mg/L Monthly 12 No value 1.1 4.7 3.4 0.1 Chloride mg/L Monthly 12 0 36 40 38 1 Fluoride mg/L Monthly 12 0 0.34 0.36 0.34 0.01 Nitrate mg/L Monthly 12 0 0.23 0.26 0.24 0.5 Sulphate mg/L Monthly 12 0 0.23 0.26 0.24 0.5 Sulphate mg/L Monthly 12 0 0.22 1.2 0.81 0.1 Iron mg/L Monthly 12 0 0.001 0.002 0.0015 0.01 Manganese mg/L Monthly 12 0 0.06 0.06 0.01 Zinc mg/L Monthly 12		Zone	Calcium	mg/L	Monthly	12	No value	3.9	7.8	62	0.1
Integrototion Ing.L Monthly 12 No table Int Int 0.1 Chloride mg/L Monthly 12 0 36 40 38 1 Fluoride mg/L Monthly 12 0 0.34 0.36 0.34 0.01 Nitrate mg/L Monthly 12 0 0.23 0.26 0.24 0.5 Sulphate mg/L Monthly 12 0 0.22 1.2 0.81 0.1 Iron mg/L Monthly 12 0 0.001 0.002 0.0015 0.01 Maganese mg/L Monthly 12 0 0.06 0.06 0.01 Zinc mg/L Monthly 12 0 0.03 0.03 0.03 0.05 Boron mg/L Monthly 12 0 0.024 0.27 0.25 0.01 Copper mg/L Monthly 12 0		0011	Magnesium	mg/L	Monthly	12	No value	1 1	4 7	3.4	0.1
Fluoride mg/L Monthly 12 0 0.0 1.0 0.0 1.0 Nitrate mg/L Monthly 12 0 0.34 0.36 0.34 0.01 Nitrate mg/L Monthly 12 0 0.23 0.26 0.24 0.5 Sulphate mg/L Monthly 12 0 0.2 1.2 0.81 0.1 Iron mg/L Monthly 12 0 0.01 0.05 0.03 0.01 Manganese mg/L Monthly 12 0 0.06 0.06 0.01 Zinc mg/L Monthly 12 0 0.03 0.03 0.03 0.05 Boron mg/L Monthly 12 0 0.024 0.27 0.25 0.01 Geoper mg/L Monthly 12 0 0.033 0.03 0.03 0.024 0.027 0.25 0.01			Chloride	mg/L	Monthly	12	0	36	40	38	1
Nitrate mg/L Monthly 12 0 0.04 0.05 0.04 0.05 0.03 0.01 Iron mg/L Monthly 12 0 0.001 0.002 0.0015 0.01 Manganese mg/L Monthly 12 0 0.066 0.06 0.01 Zinc mg/L Monthly 12 0 0.03 0.03 0.03 0.05 Boron mg/L Monthly 12 0 0.024 0.27 0.25 0.01 Copper <td></td> <td></td> <td>Eluoride</td> <td>mg/L</td> <td>Monthly</td> <td>12</td> <td>0</td> <td>0.34</td> <td>0.36</td> <td>0.34</td> <td>0.01</td>			Eluoride	mg/L	Monthly	12	0	0.34	0.36	0.34	0.01
Sulphate mg/L Monthly 12 0 0.25 0.26 0.24 0.3 Iron mg/L Monthly 12 0 0.2 1.2 0.81 0.1 Iron mg/L Monthly 12 0 <0.01			Nitrate	mg/L	Monthly	12	0	0.23	0.26	0.24	0.5
Iron mg/L Monthly 12 0 0.2 1.2 0.81 0.1 Manganese mg/L Monthly 12 0 <0.01			Sulphate	mg/L	Monthly	12	0	0.20	1 2	0.24	0.0
Manganese mg/L Monthly 12 0 0.01 0.02 0.03 0.01 Zinc mg/L Monthly 12 0 0.06 0.06 0.01 0.01 0.02 0.015 0.01 Aluminium mg/L Monthly 12 0 0.03 0.03 0.03 0.05 Boron mg/L Monthly 12 0 0.024 0.27 0.25 0.01 Copper mg/L Monthly 12 0 0.003 0.026 0.043 0.03			Iron	mg/L	Monthly	12	0	<0.2	0.05	0.03	0.1
Zinc mg/L Monthly 12 0 0.001 0.002 0.0013 0.013 Aluminium mg/L Monthly 12 0 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.03 0.04 0.05 Boron mg/L Monthly 12 0 0.024 0.27 0.25 0.01 Copper mg/L Monthly 12 0 0.003 0.066 0.043 0.03			Manganese	mg/l	Monthly	12	0	0.01	0.002	0.0015	0.01
Aluminium mg/L Monthly 12 0 0.03 0.03 0.03 0.03 0.05 Boron mg/L Monthly 12 0 0.24 0.27 0.25 0.01 Copper mg/L Monthly 12 0 0.03 0.06 0.043 0.03			Zinc	mg/L	Monthly	12	0	0.001	0.002	0.06	0.01
Boron mg/L Monthly 12 0 0.03			Aluminium	mg/L	Monthly	12	0	0.03	0.00	0.03	0.05
Boron Ingr Wonting 0 0.24 0.27 0.25 0.01 Copper mg/L Monthly 12 0 0.003 0.06 0.043 0.03			Boron	mg/L	Monthly	12	0	0.03	0.03	0.05	0.00
			Copper	mg/L	Monthly	12	0	0.003	0.006	0.0043	0.03



Appendix B – Reticulation E. coli verification monitoring

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 5.1 to 5.12 – Reticulation E. coli verification monitoring

Drinking water scheme: Anakie scheme

Year					2020	to	2021					
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											

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

The Public Health Regulation 2018 (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.



Drinking water scheme:

Bauhinia Scheme

Year					2020	to	2021					
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	0
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	11
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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme: Blackwater & Bluff Scheme

Year					2020	to	2021					
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	6	5	5	5	6	5	5	6	5	6	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	62	63	63	62	62	64	64	64	64	64	65	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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme:

Capella Scheme

Year					2020	to	2021					
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	4	5	4	4	5	4	3	4	5	4	5	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	50	51	51	50	51	52	51	51	51	51	52	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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme:

Comet Scheme

Year					2020	to	2021					
							1					
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected												
No. of Sample's concelled	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	13	13	13	13	13	13	13	13	13	13	13	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	100.05/	400.007	100.05/	400.05/	400.000	100.05/	400.000	100.05/	100.05/	100.05/	400.004	400.00/
	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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme: Dingo Scheme

2020 2021 Year to July Sept Month Oct Nov Dec Feb Mar Jun Aug Jan Apr May No. of samples collected 1 1 1 1 1 1 1 1 1 1 1 1 No. of samples collected in which E. coli 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

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

The *Public Health Regulation 2018* (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.



Drinking water scheme: Duaringa Scheme

Year					2020	to	2021					
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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme: Emerald Scheme

Year					2020	to	2021					
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	8	10	8	8	10	8	8	8	10	8	10	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	100	102	102	100	102	104	104	104	104	104	106	104
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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme: **Rolleston Scheme**

Year					2020	to	2021					
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	1	1	1	1	1	2	2	1	1	1	0
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	13	14	14	14	14	13
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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme: Sapphire and Rubyvale Scheme

Year					2020	to	2021					
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	8	10	8	8	10	8	8	8	10	8	10	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	100	102	102	100	102	104	104	104	104	104	106	104
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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme: Springsure Scheme

Year					2020	to	2021					
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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Drinking water scheme: Tieri Scheme

Year					2020	to	2021					
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Мау	Jun
No. of samples collected	4	5	4	4	5	4	4	4	5	4	5	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	50	51	51	50	51	52	52	52	52	52	53	52
	50	51	51	50	51	52	52	52	52	52	55	52
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
-	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											

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE The Public Health Regulation 2018 (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.



Appendix C – Implementation of the DWQMP Risk Management Improvement Program

Table 6.1 to 6.14 – Progress against the RMIP program in the approved DWQMP

Legend: Complete Changes

RMIP	Duesses Chan	R	isk Management Improvements			Responsible
Reference	Process Step	Short term	Medium term	Long term		Position
	CHRC WIDE					
CHR 1	Procedures		Procedures required for bore inspection, reservoir inspection, pH correction, pipeline transfer.		Disinfection, Filtration, Coagulation & Fluoridation procedures completed for all sites. Remaining procedures listed to be drafted by end of 2021/2022 FY.	Treatment Co-ordinator
CHR 3, CHR 4	Catchment Management - microplastics	Ensure mains replacement/repair procedure adequately addresses risk of microplastics.	Investigate testing options.		Mains replacement/repair procedure under development. Add to monitoring schedule in all surface schemes.	Network Co-ordinator / Planning Co-ordinator
CHR 5, CHR 6	Network Management - Legionella	See bacteria RMIP items.		-	Capital works tender out to market for Springsure cooling system. Existing cooling systems isolated/bypassed.	Engineering Co-ordinator
CHR 5, CHR 6	Network Management - Naegleria	See bacteria RMIP items.	Consider Raw Water awareness alert on CHRC website		Develop plan to monitor this water quality parameter.	Planning Co-ordinator
CHR 7	SCADA Lockout	Investigate alarm level and lockout to operators			Reviewed in greatest order of risk, ongoing monitoring required. Needs to be done to whole system consistently, can be included in current SCADA strategy scope of work.	Engineering Co-ordinator
CHR 8, CHR 9, CHR 10	Treated water storage / Reservoirs	Formalise inspection checklist	Investigate integrity of vermin proofing	Implement appropriate action	Inspections completed 2019 by external contractors. Opal St WTP reservoir roof replaced. 10-15 items on CAPEX list 2021/2022 FY leak repairs, cleaning, external checks.	Manager WU
CHR 11	Reticulation		need to develop routine flushing program		Network program under development, to include valve exercising and flushing	WU Strategic Manager



CHR 12, CHR 13, CHR 14	Training / operator knowledge	Implement training plans / ensure other staff are confident to operate scheme	Operators to have a minimum Cert III in Water Operations or equivalent.		Continual training required due to ongoing staff turnover. All current operators either have or are in the process of attaining Cert III.	Treatment Co-ordinator
CHR 15, CHR16	Recruitment / staff retention	Fill vacancies	Corporate people plan and plan for upskilling		Recruitment is ongoing due to continual staff turnover. Operator rotations to continue. More Emerald based operators to know other plants i.e., Anakie, Sapphire, Springsure, Rolleston, Comet. Blackwater based operators to know Bluff, Dingo, Duaringa, Bauhinia.	Treatment Co-ordinator
CHR 17, CHR 18	Maintenance/Key Consultants		develop internal skills to reduce reliance on external support / critical spares to be identified	Preventive maintenance of air compressors, blowers, centrifuges, spare retic pumps, dam switchboards, fluoride plant maintenance, chlorine replacement work, generator plugs.	Maintenance schedules to be developed to assist with costing of tenders and technical specifications.	Treatment Co-ordinator
CHR 19, CHR 20	Cyber Security	Investigate governance structure. See site security RMIP items.	Investigate cyber security detection process. Investigate current response and recovery plans, add cyber security focused section if necessary.		Engage consultant to assist with review of current plans and identify gaps specific to water utilities. Include in SCADA strategy scope of work and linked to site security.	Manager WU
CHR 21, CHR 22, CHR 23	Site Security	Implement non-capital Audit recommendations. Investigate reducing temptation of site access for robbery.	Conduct Site Security Assessment	Implement capital Audit and Assessment recommendations.	Reports completed; items noted in council wide risk assessment. Continuing to implement non- capital audit recommendations.	Manager WU
CHR 24, CHR 25	Sole Operators	Investigate practicality of corporate SOP and self- audit current compliance	Implement actions of investigation		Cross training and operator rotations to continue. More Emerald based operators to know other plants i.e., Anakie, Sapphire, Springsure, Rolleston, Comet. Blackwater based operators to know Bluff, Dingo, Duaringa, Bauhinia. Linkage to CHRC lone worker policy.	Treatment Co-ordinator
CHR 26, CHR 27	Standpipe & Hydrant access	Notify standpipe and hydrant users of risks and the use of an air gap	Install RPZ		New Standpipes installed with RPZ's in Emerald, Blackwater, Duaringa and Sapphire. Additional standpipes at Tieri and Bluff (turned off but physically still installed).	Manager WU



CHR 28	Health Based Targets	Assessment of current barrier and catchment	Investigate options to implement	Implement capital recommendations	Catchment Risk Assessments completed for all schemes. Raw Water catchment sampling commenced in some locations.	Manager WU
CHR 29	Water Quality Data		Add water quality data to site based DWQMPs.		Included in DWQMP review.	Planning Co-ordinator

RMIP Reference	Durana Chan	Risk Management Improvements				Responsible
	Process Step	Short term	Medium term	Long term		Position
	ANAKIE					
ANA 1	Raw water storage	design/install new tank			Capex project has commenced design and land acquisition for replacement of tanks. Installation expected to occur 2021-2022 FY.	Manager WU
ANA 2	Disinfection	Trend and response analysis	Action outcomes of analysis		Awaiting resource prioritisation.	Engineering Co-ordinator

RMIP Reference	Process Step	Risk Management Improvements				Responsible
		Short term	Medium term	Long term	Status as at 50/00/2021	Position
	BAUHINIA					
BAU 2, BAU 3	Disinfection	Trend and response analysis	Chlorine dosing upgrade		Assessing operational structure and investigating upgrade of chlorine dosing system and monitoring. Site is not powered so exploring solar options.	Manager WU

RMIP Reference	Drococc Stop	Risk Management Improvements			Status as at 20/06/2021	Responsible
	Process step	Short term	Medium term	Long term		Position
	BLACKWATER					
BLK 1	Raw Water Abstraction		Investigate new raw water pumps		New raw water pumps installed.	Project Team
BLK 2	Filtration		investigate ripen to waste for filters 5 and 6		Project awarded and completed.	Project Team
BLK 3, BLK 4	Disinfection	Chlorate sampling	data collection for options analysis	Investigate options - chlorine gas/dual storage	Awaiting prioritisation in CAPEX budget.	Manager WU



BLK 5	Reticulation	Investigate standby generator (reservoirs)		Awaiting prioritisation in CAPEX budget. Design completed for WTP; design not completed for Reservoir generator.	Manager WU
BLK 6	Redosing (Bluff Reservoir)		replace generator on site	Awaiting prioritisation in CAPEX budget	Manager WU

RMIP	Drocoss Stor	Risk Management Improvements			Status as at 20/06/2021	Responsible
Reference	Process step	Short term	Medium term	Long term		Position
	CAPELLA					
CAP 1, CAP 2	Catchment		online monitoring	Media Replacement	Media replacement completed late 2020.	Project Team
CAP 3, CAP 4	pH correction	data collection for procedure target ranges	Procedure / investigate alarm		pH instrument to be procured, installed and monitored in SCADA.	Treatment Co-ordinator
CAP 5, CAP 6	Coagulation	clarifier Turbidity monitoring	investigate online monitoring		Turbidity meter installed, awaiting commissioning.	Engineering Co-ordinator
CAP 7, CAP 8	Filtration		auto backwash, shutdowns, to be investigated.	Investigate replace filter media	Auto backwash - awaiting CAPEX prioritisation. Shutdowns completed; filter media replaced.	Manager WU
CAP 9, CAP 10		Data collection on turbidity spikes	Investigate ripening to waste	Filter upgrade	Awaiting prioritisation within CAPEX budget.	Manager WU
CAP 11, CAP 12	Disinfection	Investigate ACH option and collect data	Investigate pH correction options		ACH system installation completed which has resolved pH correction issues.	Project Team
CAP 13, CAP 14	Transfer from Tieri to Capella	Data collection of chlorine levels	Develop transfer procedure		Auto dosing of chlorine when pipeline is running.	Engineering Co-ordinator

RMIP	RMIP Process Step ference	Risk Management Improvements			Status as at 20/05/2021	Responsible
Reference		Short term	Medium term	Long term	Status as at 50/06/2021	Position
	COMET					
COM 1	Raw Water Abstraction		Reinstate duty/standby pumps and replace jetty/pier		Construction to commence 21/22 FY.	Project Team
COM 2, COM 3	pH correction	data collection for procedure target ranges. Online pH monitoring needs to be replaced.	procedure / investigate alarm		Awaiting resource prioritisation.	Treatment Co-ordinator
COM 4, COM 5	Coagulation	clarifier Turbidity monitoring	online monitoring		Awaiting installation of turbidity instrumentation.	Treatment Co-ordinator



COM 6, COM 7	Filtration	Data collection on turbidity spikes	Investigate ripening to waste		Valves have been installed and commissioned. Have currently been configured into the backwash sequence to lower filter level prior to backwash. Outstanding action to add filter to waste at end of backwash sequence and at plant start-up.	Engineering Co-ordinator
COM 8, COM 9	Disinfection	Chlorate sampling	data collection for options analysis	Investigate options, dual storage / chlorine gas	Awaiting prioritisation within CAPEX budget.	Manager WU
COM 10, COM 11	Reticulation		Investigate UPS and generator for transfer pumps to high tower	Implement appropriate action	Awaiting prioritisation within CAPEX budget and Tower UPS to be included.	Manager WU

RMIP	Drococc Stop	R	isk Management Improvements	Status as at 30/06/2021	Responsible	
Reference	Process step	Short term	Medium term	Long term		Position
	DINGO					
DIN 1, DIN 2, DIN 3	Catchment		online monitoring	Media Replacement/Filter replacement	Ultra-filtration membrane plant installed. Awaiting prioritisation within CAPEX budget for media/filter replacement.	Project Team
DIN 4			Investigate need and use of PAC		Awaiting prioritisation within CAPEX budget.	Manager WU
DIN 5			Investigate structural condition of pontoon	Relocate pumps	Awaiting prioritisation within CAPEX budget.	Manager WU
DIN 6, DIN 7	Coagulation	clarifier Turbidity monitoring	Turbidity meter online monitoring		Design complete. Construction deferred to 2022-2023 FY.	Project Team
DIN 8, DIN 9, DIN 3	Filtration	Filtered Turbidity monitoring	Turbidity meter online monitoring	Filter replacement	Ultra-filtration membrane plant installed. Awaiting prioritisation within CAPEX budget for media/filter replacement.	Project Team
DIN 10, DIN 11, DIN 3		Collect data	Investigate ripen to waste option	Filter replacement to include ripen to waste.	Ultra-filtration membrane plant installed. Awaiting prioritisation within CAPEX budget for media/filter replacement.	Project Team
DIN 13, DIN 14	Disinfection	Chlorate sampling	data collection for options analysis	Investigate options, dual storage / chlorine gas	Awaiting prioritisation within CAPEX budget.	Manager WU



RMIP Reference	Drocoss Stor	Risk Management Improvements			Status as at 20/06/2021	Responsible
	Process Step	Short term	Medium term	Long term		Position
	DUARINGA					
DUA 1, DUA 2, DUA 3	Catchment		online monitoring	Media Replacement/Filter replacement	CAPEX project - design complete. Construction deferred to FY22-23.	Project Team
DUA 4	Coagulation	clarifier Turbidity monitoring	Turbidity meter online monitoring	flow switch	CAPEX project - design complete. Construction deferred to FY22-23.	Project Team
DUA 7, DUA 8, DUA 3	Filtration	Filtered Turbidity monitoring	Turbidity meter online monitoring	Filter replacement	Ultra-filtration membrane plant installed. CAPEX project - design complete. Construction deferred to FY22-23.	Project Team
DUA 9, DUA 10	Disinfection	Chlorate sampling	data collection for options analysis	Investigate options, dual storage / chlorine gas	Awaiting prioritisation within CAPEX budget.	Manager WU

RMIP Reference	Process Step	Risk Management Improvements			Status as at 20/06/2021	Responsible
		Short term	Medium term	Long term		Position
	EMERALD EAST NOGOA					
EMEN 1, EMEN 2	pH correction	data collection for procedure target ranges	Procedure / investigate alarm			Treatment Co-ordinator
EMEN 3, EMEN 4, EMEN 5	Coagulation	develop operational rules and document procedure	investigate control of supernatant return	Design and implement solution	Investigating capital work upgrades required for the installation of second wash water tank. Awaiting prioritisation within CAPEX budget.	Manager WU

RMIP Reference	Process Step	Risk Management Improvements				Responsible
		Short term	Medium term	Long term		Position
	EMERALD OPAL ST					
EMOS 1, EMOS 2, EMOS 3	Coagulation - recycle stream / blanket destabilised	develop operational rules and document procedure	turbidity meter as control of supernatant return	dewatering upgrade	Ongoing options analysis on dewatering system.	Manager WU
EMOS 4, EMOS 5	Filtration		auto backwash to be investigated.	Investigate need to replace filter media	Media replacement and new backwash pump design to be completed 2021-2022 FY.	Manager WU



EMOS 6		investigate new backwash pumps instead of backflow prevention valve		New backwash pump design to occur 2021-2022 FY.	Manager WU
EMOS 7		investigate blanking off valve		Awaiting prioritisation within CAPEX budget and requires further scoping.	Manager WU
EMOS 8, EMOS 9	Reticulation	Investigate UPS or other options	Implement appropriate action	Clearwater switchboard replacement within 2021-2022 FY budget.	Project Team

RMIP Reference	Process Step	Risk Management Improvements			Status as at 20/06/2021	Responsible
		Short term	Medium term	Long term		Position
	ROLLESTON					
ROL 1, ROL 2	Coagulation	manual turbidity testing at clarifier	turbidity meter		Clearwater switchboard replacement out to tender. Ultra-filtration membrane plant also installed which optimises turbidity.	Project Team
ROL 5, ROL 6	Disinfection		calculation of CT, probably OK, but need to check.	pH adjustment to be considered.	Concept design for pH undertaken and waiting for CAPEX prioritisation.	Manager WU
ROL 7		Chlorate sampling			Consider options to reduce chlorate levels in chemical dosing relocation project.	Engineering Co-ordinator

RMIP Reference	Process Step	Risk Management Improvements				Responsible
		Short term	Medium term	Long term		Position
	SPRINGSURE					
SPR 1, SPR 2	Network Management - Legionella / Naegleria	Assess water cooling options with respect to this risk i.e., Keep current cooling systems offline.	Consider Raw Water awareness alert on CHRC website		Consultant engaged for preliminary design of cooling system for Springsure. Existing cooling systems isolated/bypassed.	Engineering Co-ordinator
SPR 3	Disinfection		Need to upgrade to auto dosing		Awaiting prioritisation within CAPEX budget.	Manager WU
SPR 4, SPR 5	Cooling systems	Check integrity and sealing	Seal if this is an issue		As a result of consultant review, cooling system taken offline.	Manager WU



RMIP Reference	Process Step	Risk Management Improvements			Status as at 20/06/2021	Responsible
		Short term	Medium term	Long term		Position
	TIERI					
TIE 1, TIE 2	Catchment		online monitoring	Media Replacement	Media replacement completed. Meter commissioning and online monitoring requires further action.	Engineering Co-ordinator
TIE 3 <i>,</i> TIE 4	Raw Water Abstraction	develop operational rules and document procedure	investigate turbidity meter as control of supernatant return		Turbidity meter installed, awaiting commissioning.	Engineering Co-ordinator
TIE 5, TIE 6	pH correction	data collection for procedure target ranges	Procedure / investigate alarm		Operating rules to be developed.	Treatment Co-ordinator
TIE 7 <i>,</i> TIE 8	Coagulation	clarifier Turbidity monitoring	online monitoring		Turbidity meter installed.	Engineering Co-ordinator
TIE 9, TIE 10			Investigate recycle control. Requires flow meter/pump upgrade.		Awaiting prioritisation within CAPEX budget.	Manager WU
TIE 12, TIE 13		Data collection on turbidity spikes	Investigate ripening to waste		Awaiting prioritisation within CAPEX budget.	Manager WU
TIE 14, TIE 15		Investigate lockout		Investigate blanking off	Awaiting prioritisation within CAPEX budget.	Engineering Co-ordinator
TIE 16, TIE 17	Disinfection	Investigate ACH option and collect data	Investigate pH correction options		Awaiting prioritisation within CAPEX budget.	Manager WU

