



Drinking Water Quality Management Plan (DWQMP) report

2015 - 2016

Etheridge Shire Council

SPID: SP49

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Georgetown

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Glossary of terms

ADWG 2004	Australian Drinking Water Guidelines (2004). Published by the National Health and Medical Research Council of Australia
ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
<i>E. coli</i>	<i>Escherichia coli</i> , a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
HACCP	Hazard Analysis and Critical Control Points certification for protecting drinking water quality
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
MPN/100mL	Most probable number per 100 millilitres
CFU/100mL	Colony forming units per 100 millilitres
<	Less than
>	Greater than

1. Introduction

This report documents the performance of Etheridge Shire Council's drinking water service with respect to water quality and performance in implementing the actions detailed in the drinking water quality management plan (DWQMP) as required under the *Water Supply (Safety and Reliability) Act 2008* (the Act).

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

This template has been prepared in accordance with the *Water Industry Regulatory Reform – drinking water quality management plan report factsheet* published by the Department of Energy and Water Supply, Queensland, accessible at www.dews.qld.gov.au.

2. Overview of Operations

Georgetown's water supply is drawn from the aquifer in the alluvial bed sands of the Etheridge River. Surface water filters through the alluvial sands of the river bed to the aquifer where it is drawn from a series of wells. Due to high levels of manganese and iron in Georgetown's retic water a treatment plant was installed in March-May 2015. The treatment comprises of a flocculation tank, 3 sand\carbon media filters and 3 DMI filters. Water is disinfected before reticulation.

Forsayth's water is sourced from the Big Reef Dam located 6 kilometres from the township. The water supply is treated by a DAF water treatment plant commissioned in 2006. Treated water is fed to a 90 kL service reservoir which in turn gravity feeds the township.

The treatment comprises of a pre aeration system, flocculation tank, dissolved air floatation system and 4 sand media filters. Water is disinfected before reticulation.

The DAF system struggles when the raw water is at its worst and we are working towards an extra pre-treatment step before the DAF which will improve the end turbidity and chlorine by-product levels.

3. Actions taken to implement the DWQMP

Georgetown

Management has conducted regular tool box meetings to make operational staff aware and familiar with the DWQMP and its implementation. Risk management measures are performed as written in our DWQMP. This includes operational procedures/practices and operational and verification monitoring. We have continued to work through improvements in our Risk management improvement plan.

Operational parameters have been checked and maintained at locations regularly as per our DWQMP. Verification testing has confirmed the operational monitoring programme to be effective.

Forsayth

Management has conducted regular tool box meetings to make operational staff aware and familiar with the DWQMP and its implementation. Risk management measures are performed as written in our DWQMP. This includes operational procedures/practices and operational and verification monitoring. We have continued to work through improvements in our Risk management improvement plan.

Operational parameters have been checked and maintained at locations regularly as per our DWQMP. Verification testing has confirmed the operational monitoring programme to be effective.

Progress in implementing the risk management improvement program

We have made progress in implementing the risk management improvement program. We have worked towards all actions and completed some of them. For all progress information see Appendix B – Implementation of the Risk Management Improvement Program. Table 1 – Progress against the risk management improvement program in the approved DWQMP

Amendments made to the DWQMP

We have recently reviewed our DWQMP and have made the following amendments.

Georgetown

Update the incident history and discussion about manganese & chlorate. Update the water supply scheme and infrastructure details to add the Water Treatment Plant. Update the rolling E.coli compliance history & water Quality Complaints table. Revise the Hazard identification and risk assessment table. Revise and update any change to staff. Revise and adjust the Risk management improvement program. Revise and adjust the Operational and Verification monitoring Program.

Forsyth

Update the rolling E.coli compliance history & water Quality Complaints table. Revise the Hazard identification and risk assessment table. Revise and update any change to staff. Revise and adjust the Risk management improvement program. Revise and adjust the Operational and Verification monitoring Program.

4. Compliance with water quality criteria for drinking water

See appendix A – Summary of compliance with water quality criteria

5. Notifications to the Regulator under sections 102 and 102A of the Act

This financial year there were no new instances at Forsyth where the Regulator was notified under sections 102 or 102A of the Act.

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There was 1 ongoing incident at Georgetown for the detection of a parameter with no water quality criteria which was chlorate.

There was 1 ongoing incident at Forsyth for the detection of a parameter with no water quality criteria which was chlorate.

There were 2 minor detections of Bromide (which has no water quality parameter) in Georgetown and 1 detection in Forsyth. These detections were not identified and incident reports were not done at the time although incidents are now opened after later detections.

We now add the water test results to a spread sheet when they come in to better assess the results. Regularly updating this spread sheet will also help to complete our annual report.

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

Incident Description: We have an ongoing incident for detection of Chlorate - a parameter with no water quality criteria taken from the Georgetown Rec Grounds. 0.367, 0.442, 1.70, 1.52 & 0.456 Mg/L was/were detected.

Corrective and Preventative Actions We are testing for chlorate quarterly and monitoring the situation. We turn over our chlorine as frequent as possible and keep it out of the sun.

Incident Description: We have an ongoing incident for detection of Bromide - a parameter with no water quality criteria taken from the Georgetown Rec Grounds. 0.008, & 0.013 Mg/L was/were detected.

Corrective and Preventative Actions We are testing monthly at this stage and monitoring the situation. We turn over our chlorine as frequent as possible and keep it out of the sun.

Incident Description: We have an ongoing incident for detection of Chlorate - a parameter with no water quality criteria taken from the Forsayth Library. 1.45, 3.13, 19.5, 8.04 & 1.59 Mg/L was/were detected.

Corrective and Preventative Actions We are testing for chlorate quarterly and monitoring the situation. We turn over our chlorine as frequent as possible and keep it out of the sun. We are working towards upgrading our treatment plant.

Incident Description: We have an ongoing incident for detection of Bromide - a parameter with no water quality criteria taken from the Forsayth Library. 0.009 Mg/L was/were detected.

Corrective and Preventative Actions We are testing monthly at this stage and monitoring the situation. We turn over our chlorine as frequent as possible and keep it out of the sun.

6. Customer complaints related to water quality

Etheridge Shire Council is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Throughout the year the following complaints about water quality were received:

Table 2 - complaints about water quality, (including per 1000 customers)

	Suspected Illness	Discoloured water	Taste and odour	Total
Georgetown	0	0	0	0
Forsayth	0	0	0	0
Total	0	0	0	0

Suspected Illness

Complaints are sometimes received from customers who suspect their water may be associated with an illness they are experiencing. Etheridge shire council investigates each complaint relating to alleged illness from our water quality, typically by testing the customers tap and closest reticulation sampling point for the presence of *E. coli*.

During 2015/2016 there were 0 confirmed cases of illness arising from the water supply system.

7. Findings and recommendations of the DWQMP auditor

An audit has not occurred. Our first audit is required by 30 June 2017.

8. Outcome of the review of the DWQMP and how issues raised have been addressed

An internal review of the DWQMP has been conducted. Everything was reviewed and updated. As this was the first review we were able to greatly improve the plan. The Georgetown water treatment plant was added and the hazard and risk assessment reviewed accordingly. We added an Emergency Stakeholders Contact List table to assist in case of an emergency. The plan was amended and approved with help from the Drinking water Regulators.

Appendix A – Summary of compliance with water quality criteria

The results from the verification monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the *Water Quality and Reporting Guideline for a Drinking Water Service*.

The reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result.

Other verification monitoring was carried out as per our DWQMP.

The presence of potentially toxic Blue/green algae in the raw water at Forsayth is often detected and is treated and removed from the retic water. Our verification monitoring covers all aspects. It shows any operational faults which can be rectified fast and confirms our operational monitoring is working and remains appropriate.

Verification testing continues to show the detection of Chlorate in Georgetown and Forsayth. Results are showing that detection is higher in the summer and when the raw water is at its worst. The results from Forsayth are practically high at this time of year and we have been investigating pre-treatment before the pre-chlorine injection point.

Our verification monitoring results in the following table shows verification results for treated retic water. They also show operational results from the raw water to help compare and show the achievement of the treatment plants.

Table 3 - Verification monitoring results

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Georgetown	Reticulation	Turbidity	Ntu	Daily	366	366	NA	.08	15.70	.40		In House
Georgetown	Reticulation	True colour	Pt/Co	Twice a week	102	102	NA	0.00	23.00	1.93		In House
Georgetown	Reticulation	PH		Daily	364	364	NA	5.6	7.5	6.5		In House
Georgetown	Reticulation	Chlorine Free	Ppm	Daily	547	547	NA	0.09	1.85	.63		In House
Georgetown	Reticulation	Chlorine Total	Ppm	Daily	366	366	NA	.08	2.25	.66		In House
Georgetown	Reticulation	Aluminium	Mg/L	Monthly	6	6	NA	0.008	0.015	0.011	<0.005	Cairns Regional Council
Georgetown	Reticulation	Silicon	Mg/L	Monthly	12	12	NA	15	22	18	<0.10	Cairns Regional Council
Georgetown	Reticulation	Mercury	ug/L	Monthly	12	0	0	<0.1	<0.1	0	<0.1	Cairns Regional Council
Georgetown	Reticulation	Arsenic	Mg/L	Monthly	12	3	0	<0.001	0.001	0	<0.001	Cairns Regional Council
Georgetown	Reticulation	Cadmium	Mg/L	Monthly	12	0	0	<0.0001	<0.0001	0	<0.0001	Cairns Regional Council
Georgetown	Reticulation	Chromium	Mg/L	Monthly	12	0	0	<0.001	<0.001	0.000	<0.001	Cairns Regional Council
Georgetown	Reticulation	Copper	Mg/L	Monthly	12	12	0	0.014	0.110	0.027	<0.001	Cairns Regional Council
Georgetown	Reticulation	Iron	Mg/L	Monthly	12	2	NA	<0.014	0.110	0.027	<0.01	Cairns Regional Council
Georgetown	Reticulation	Lead	Mg/L	Monthly	12	6	0	<0.001	0.001	0	<0.001	Cairns Regional Council
Georgetown	Reticulation	Manganese	Mg/L	Monthly	12	10	0	<0.001	0.006	0.001	<0.001	Cairns Regional Council
Georgetown	Reticulation	Nickel	Mg/L	Monthly	12	1	0	<0.001	0.001	0	<0.001	Cairns Regional Council
Georgetown	Reticulation	Zinc	Mg/L	Monthly	12	9	NA	<0.001	0.009	0.005	<0.005	Cairns Regional Council
Georgetown	Reticulation	Calcium	Mg/L	Monthly	12	12	NA	5.0	9.5	7.0	<0.20	Cairns Regional Council
Georgetown	Reticulation	Magnesium	Mg/L	Monthly	12	12	NA	1.3	2.8	1.9	<0.10	Cairns Regional Council
Georgetown	Reticulation	Potassium	Mg/L	Monthly	12	12	NA	2.0	2.8	2.3	<0.10	Cairns Regional Council
Georgetown	Reticulation	Sodium	Mg/L	Monthly	12	12	NA	12	17	13.5	<1	Cairns Regional Council
Georgetown	Reticulation	Total Hardness	MgCaCO3/L	Monthly	12	12	NA	19	35	25	<1	Cairns Regional Council
Georgetown	Reticulation	Salinity	Psu	Monthly	12	12	NA	.0564	.0844	.0654		Cairns Regional Council
Georgetown	Reticulation	Total Dissolved Solids	Mg/L	Monthly	12	12	NA	72	100	85	<1	Cairns Regional Council
Georgetown	Reticulation	Electrical Conductance	Us/cm	Monthly	12	12	NA	110	170	128	<1	Cairns Regional Council
Georgetown	Reticulation	Total alkalinity	MgCaCO3/L	Monthly	12	12	NA	25	55	37	<0.1	Cairns Regional Council
Georgetown	Reticulation	Fluoride	Mg/L	Monthly	12	12	0	.06	.13	.08	<0.02	Cairns Regional Council
Georgetown	Reticulation	Sulphate	Mg/L	Monthly	12	12	0	3.5	16	9.1	<0.01	Cairns Regional Council
Georgetown	Reticulation	Chloride	Mg/L	Monthly	12	12	NA	7.9	17.0	11.1	<0.1	Cairns Regional Council
Georgetown	Reticulation	Chlorate	Mg/L	Quarterly	5	5	NA	0.367	1.700	.897	<0.005	Cairns Regional Council
Georgetown	Reticulation	Chlorite	Mg/L	Quarterly	5	0	0	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Georgetown	Reticulation	Bromate	Mg/L	Quarterly	5	0	0	<0.005	<0.005	<0.005	<0.005	Cairns Regional Council
Georgetown	Reticulation	Bromide	Mg/L	Quarterly	5	2	NA	<0.005	0.013	0.004		Cairns Regional Council
Georgetown	Reticulation	Giardia, protozoa	Mg/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Georgetown	Reticulation	Organochlorine Pesticides	Ug/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Georgetown	Raw	Aluminium	Mg/L	Quarterly	6	6	NA	0.017	0.301	0.089	<0.005	Cairns Regional Council
Georgetown	Raw	Silicon	Mg/L	Quarterly	3	3	NA	17	19	18	<0.10	Cairns Regional Council
Georgetown	Raw	Mercury	ug/L	Quarterly	10	0	NA	<0.01	<0.01	<0.01	<0.01	Cairns Regional Council
Georgetown	Raw	Arsenic	Mg/L	Monthly	12	11	NA	<0.001	0.002	0.001	<0.001	Cairns Regional Council
Georgetown	Raw	Cadmium	Mg/L	Monthly	12	8	NA	<0.0001	0.0002	0	<0.0001	Cairns Regional Council
Georgetown	Raw	Chromium	Mg/L	Monthly	12	0	NA	<0.001	<0.001	0	<0.001	Cairns Regional Council
Georgetown	Raw	Copper	Mg/L	Monthly	12	12	NA	0.001	0.096	0.021	<0.001	Cairns Regional Council
Georgetown	Raw	Iron	Mg/L	Monthly	12	11	NA	<0.01	0.962	0.306	<0.01	Cairns Regional Council
Georgetown	Raw	Lead	Mg/L	Monthly	12	6	NA	<0.001	0.002	0	<0.001	Cairns Regional Council
Georgetown	Raw	Manganese	Mg/L	Monthly	12	11	NA	<0.001	0.340	0.189	<0.001	Cairns Regional Council
Georgetown	Raw	Nickel	Mg/L	Monthly	12	7	NA	<0.001	0.001	0	<0.001	Cairns Regional Council
Georgetown	Raw	Zinc	Mg/L	Monthly	12	9	NA	<0.005	0.026	0.008	<0.005	Cairns Regional Council
Georgetown	Raw	Calcium	Mg/L	Quarterly	3	3	NA	5.6	7.3	6.5	<0.20	Cairns Regional Council
Georgetown	Raw	Magnesium	Mg/L	Quarterly	3	3	NA	1.7	2.6	2.2	<0.10	Cairns Regional Council
Georgetown	Raw	Potassium	Mg/L	Quarterly	3	3	NA	2.1	2.5	2.3	<0.10	Cairns Regional Council
Georgetown	Raw	Sodium	Mg/L	Quarterly	3	3	NA	7.7	11	9	<1	Cairns Regional Council
Georgetown	Raw	Total Hardness	MgCaCO3/L	Quarterly	3	3	NA	21	29	25	<1	Cairns Regional Council
Georgetown	Raw	Salinity	Psu	Quarterly	3	3	NA	0.0513	0.0547	0.0529		Cairns Regional Council
Georgetown	Raw	Total Dissolved solids	Mg/L	Quarterly	3	3	NA	63	87	74	<1	Cairns Regional Council
Georgetown	Raw	Electrical conductance	Us/cm	Quarterly	3	3	NA	100	110	103		Cairns Regional Council
Georgetown	Raw	Total Alkalinity	MgCaCO3/L	Quarterly	3	3	NA	36	45	40	<0.1	Cairns Regional Council
Georgetown	Raw	Fluoride	Mg/L	Quarterly	3	3	NA	.06	.12	.09	<0.02	Cairns Regional Council
Georgetown	Raw	Sulphate	Mg/L	Quarterly	3	3	NA	1.2	3.9	2.8	<0.1	Cairns Regional Council
Georgetown	Raw	Chloride	Mg/L	Quarterly	3	3	NA	3.5	6.5	5.3	<0.1	Cairns Regional Council
Forsayth	Reticulation	Turbidity	Ntu	Daily	366	366	NA	.23	9.90	1.05		In House
Forsayth	Reticulation	True colour	Pt/Co	Twice a week	105	105	NA	0.00	22.00	3.96		In House
Forsayth	Reticulation	PH	PH units	Daily	366	366	NA	6.0	7.5	6.8		In House
Forsayth	Reticulation	Chlorine Free	Ppm	Daily	450	450	NA	0.05	2.60	.49		In House

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Forsayth	Reticulation	Chlorine Total	Ppm	Daily	366	366	NA	0.12	2.90	.69		In House
Forsayth	Reticulation	Aluminium	Mg/L	Monthly	12	12	NA	0.018	4.980	0.526	<0.005	Cairns Regional Council
Forsayth	Reticulation	Silicon	Mg/L	Monthly	12	12	NA	3.9	9.4	6.0	<0.10	Cairns Regional Council
Forsayth	Reticulation	Mercury	Ug/L	Monthly	12	0	0	<0.1	<0.1	0	<0.1	Cairns Regional Council
Forsayth	Reticulation	Arsenic	Mg/L	Monthly	12	2	0	<0.001	0.001	0	<0.000	Cairns Regional Council
Forsayth	Reticulation	Cadmium	Mg/L	Monthly	12	0	0	<0.0001	<0.0001	0	<0.0001	Cairns Regional Council
Forsayth	Reticulation	Chromium	Mg/L	Monthly	12	0	0	<0.001	<0.001	0	<0.001	Cairns Regional Council
Forsayth	Reticulation	Copper	Mg/L	Monthly	12	12	0	0.003	0.009	0.005	<0.001	Cairns Regional Council
Forsayth	Reticulation	Iron	Mg/l	Monthly	12	6	NA	<0.01	0.437	0.100	<0.01	Cairns Regional Council
Forsayth	Reticulation	Lead	Mg/L	Monthly	12	1	0	<0.001	0.001	0	<0.001	Cairns Regional Council
Forsayth	Reticulation	Manganese	Mg/L	Monthly	12	12	0	0.002	0.321	0.068	<0.001	Cairns Regional Council
Forsayth	Reticulation	Nickel	Mg/L	Monthly	12	4	0	<0.001	0.001	0	<0.001	Cairns Regional Council
Forsayth	Reticulation	Zinc	Mg/L	Monthly	12	3	NA	<0.005	0.046	0.004	<0.005	Cairns Regional Council
Forsayth	Reticulation	Calcium	MG/L	Monthly	12	12	NA	3.5	9.4	6.0	<0.20	Cairns Regional Council
Forsayth	Reticulation	Magnesium	Mg/L	Monthly	12	12	NA	1.0	2.9	1.8	<0.10	Cairns Regional Council
Forsayth	Reticulation	Potassium	Mg/L	Monthly	12	12	NA	1.1	8.5	4.2	<0.10	Cairns Regional Council
Forsayth	Reticulation	Sodium	Mg/L	Monthly	12	12	NA	41	190	76	<1	Cairns Regional Council
Forsayth	Reticulation	Total Hardness	MgCaCO3/L	Monthly	12	12	NA	13	35	22	<1	Cairns regional Council
Forsayth	Reticulation	Salinity	Psu	Monthly	12	12	NA	0.134	0.506	0.213		Cairns Regional Council
Forsayth	Reticulation	Total Dissolved Solids	Mg/L	Monthly	12	12	NA	150	600	258	<1	Cairns Regional Council
Forsayth	Reticulation	Electrical Conductance	Us/cm	Monthly	12	12	NA	270	1000	439	<1	Cairns Regional Council
Forsayth	Reticulation	Total Alkalinity	MgCaCO3/L	Monthly	12	12	NA	50	130	73	<1	Cairns Regional Council
Forsayth	Reticulation	Fluoride	Mg/L	Monthly	12	12	0	0.03	0.12	0.06	<0.02	Cairns Regional Council
Forsayth	Reticulation	Sulphate	Mg/L	Monthly	12	12	0	33	150	59	<0.1	Cairns Regional Council
Forsayth	Reticulation	Chloride	Mg/L	Monthly	12	12	NA	16.0	160.0	48.5	<0.01	Cairns Regional Council
Forsayth	Reticulation	Chlorate	Mg/L	Quarterly	5	5	NA	1.450	19.500	6.472	<0.005	Cairns Regional Council
Forsayth	Reticulation	Chlorite	Mg/L	Quarterly	5	0	0	<0.005	<0.005	0	<0.005	Cairns Regional Council
Forsayth	Reticulation	Bromate	Mg/L	Quarterly	5	0	0	<0.005	<0.005	0	<0.005	Cairns Regional Council
Forsayth	Reticulation	Bromide	Mg/L	Quarterly	5	1	NA	<0.005	0.009	0.001	<0.005	Cairns Regional Council
Forsayth	Reticulation	Giardia, protozoa	Mg/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Organochlorine Pesticides	Ug/L	Annually	1	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Microcystis aeruginosa	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council

Scheme name	Scheme component	Parameter	Units	Frequency of sampling	Total No. samples collected	No. of samples in which parameter was detected	No. of samples exceeding water quality criteria	Min	Max	Average (Mean)	Limit of reporting	Laboratory name
Forsayth	Reticulation	Cylindrospermopsis raciborskii	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Dolichospermum circinale	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Chrysochloris ovalisporum	Cells/ML	Monthly	12	0	0	0	0	0		Cairns Regional Council
Forsayth	Raw	Aluminium	Mg/L	Monthly	11	11	NA	0.023	0.848	.288	<0.005	Cairns Regional Council
Forsayth	Raw	Silicon	Mg/L	Quarterly	3	3	NA	6.2	12	9.4	<0.10	Cairns Regional Council
Forsayth	Raw	Mercury	Ug/L	Monthly	11	0	NA	<0.1	<0.1	0	<0.1	Cairns Regional Council
Forsayth	Raw	Arsenic	Mg/L	Monthly	12	7	NA	<0.001	0.001	0	<0.000	Cairns Regional Council
Forsayth	Raw	Cadmium	Mg/L	Monthly	12	0	NA	<0.0001	<0.0001	0	<0.0001	Cairns Regional Council
Forsayth	Raw	Chromium	Mg/L	Monthly	12	6	NA	<0.001	0.002	0	<0.001	Cairns Regional Council
Forsayth	Raw	Copper	Mg/L	Monthly	12	12	NA	0.001	0.007	0.003	<0.001	Cairns Regional Council
Forsayth	Raw	Iron	Mg/l	Monthly	12	12	NA	0.773	10.400	3.442	<0.01	Cairns Regional Council
Forsayth	Raw	Lead	Mg/L	Monthly	12	8	NA	<0.001	0.003	0.001	<0.001	Cairns Regional Council
Forsayth	Raw	Manganese	Mg/L	Monthly	12	12	NA	0.019	0.906	0.360	<0.001	Cairns Regional Council
Forsayth	Raw	Nickel	Mg/L	Monthly	12	11	NA	<0.002	0.001	0	<0.002	Cairns Regional Council
Forsayth	Raw	Zinc	Mg/L	Monthly	12	7	NA	<0.005	0.022	0.007	<0.005	Cairns Regional Council
Forsayth	Raw	Calcium	MG/L	Quarterly	3	3	NA	3.6	9.5	6.0	<0.20	Cairns Regional Council
Forsayth	Raw	Magnesium	Mg/L	Quarterly	3	3	NA	1.2	3.0	1.9	<0.10	Cairns Regional Council
Forsayth	Raw	Potassium	Mg/L	Quarterly	3	3	NA	2.6	7.4	4.3	<0.10	Cairns Regional Council
Forsayth	Raw	Sodium	Mg/L	Quarterly	3	3	NA	3.8	7.5	5.2	<1	Cairns Regional Council
Forsayth	Raw	Total Hardness	MgCaCO3/L	Quarterly	3	3	NA	14	36	22	<1	Cairns Regional Council
Forsayth	Raw	Salinity	Psu	Quarterly	3	3	NA	0.0389	0.0709	0.0516		Cairns Regional Council
Forsayth	Raw	Total Dissolved Solids	Mg/L	Quarterly	3	3	NA	57	130	84	<1	Cairns Regional Council
Forsayth	Raw	Electrical Conductance	Us/cm	Quarterly	3	3	NA	72	140	99	<1	Cairns Regional Council
Forsayth	Raw	Total Alkalinity	MgCaCO3/L	Quarterly	3	3	NA	21	61	38	<0.1	Cairns Regional Council
Forsayth	Raw	Fluoride	Mg/L	Quarterly	3	3	NA	0.08	0.13	0.11	<0.02	Cairns Regional Council
Forsayth	Raw	Sulphate	Mg/L	Quarterly	3	3	NA	<0.5	2.6	0.8	<0.5	Cairns Regional Council
Forsayth	Raw	Chloride	Mg/L	Quarterly	3	3	NA	4.1	5.1	4.4	<0.01	Cairns Regional Council
Forsayth	Raw	Microcystis aeruginosa	Cells/ML	Monthly	12	5	NA	1250	18000	2458		Cairns Regional Council
Forsayth	Raw	Cylindrospermopsis raciborskii	Cells/ML	Monthly	12	4	NA	140	6230	618		Cairns Regional Council
Forsayth	Raw	Dolichospermum circinale	Cells/ML	Monthly	12	0	NA	0	0	0		Cairns Regional Council
Forsayth	Reticulation	Chrysochloris ovalisporum	Cells/ML	Monthly	12	1	NA	0	820	68		Cairns Regional Council

Table 4 - Reticulation *E. coli* verification monitoring

Drinking water scheme: Georgetown

Year	2014											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	5	5	5	5	5	5	5	5	5	5	5	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	60	60	60	60	60	60	60	60	60	60	60	60
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

Drinking water scheme: Georgetown

Year	2015											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	5	5	5	5	5	5	5	5	5	5	5	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	60	60	60	60	60	60	60	60	60	60	60	60
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

Drinking water scheme:
Georgetown

Year	2016											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	5	5	5	5	5	5	5	5	5	5	5	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	60	60	60	60	60	60	60	60	60	60	60	60
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

Drinking water scheme: Forsayth

Year	2014											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	3	3	3	3	3	3	3	3	3	3	3	3
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	36	36	36	36	36	36	36	36	36	36	36	36
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

Drinking water scheme: Forsayth

Year	2015											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	3	3	3	3	3	3	3	3	3	3	3	3
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	36	36	36	36	36	36	36	36	36	36	36	36
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

Drinking water scheme: Forsayth

Year	2016											
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
No. of samples collected	3	3	3	3	3	3	3	3	3	3	3	3
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	36	36	36	36	36	36	36	36	36	36	36	36
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

Appendix B – Implementation of the DWQMP Risk Management Improvement Program

Table 5 – Progress against the risk management improvement program in the approved DWQMP

IP item	Action	Priority	Description Describe the deliverable and the scope	Original Target date/s	Progress	Target date/s	Responsibility
Review and document procedures for drinking water management	1	High	Stage1: identify required procedures and prioritise their creation Stage 2; create priority procedures including mains break repair procedures	End 2013 End 2014	Stage1: Procedures have been identified and their creation prioritised. Stage 2; We are utilising our WH&S procedure Development doc and Job Analysis worksheet and are in the process of creating procedures. This is ongoing.	Complete /ongoing End 2017	Facilities Overseer
Review water quality monitoring program	2	High	Review the frequency of parameter sampling to consider reduced frequency for stable parameters Create revised verification monitoring program and submit to the regulator	End 2013	The review has been done and the frequency of sampling for stable parameters has been reduced. This is ongoing.	Complete	Facilities Overseer
Manage high turbidity at Georgetown.	3	Med	Long term plan to install filtration. Apply for grants to fund.	2023	We have installed a water treatment plant which has been successful in managing turbidity, iron & manganese.	Complete	Council
Determine risk of protozoa at Georgetown & Forsayth & manage	4	High	Investigative sampling to be done during the wet season	End 2015	We have added annual testing for protozoa to our schedule. Tests results have shown no protozoa.	Complete	Facilities Overseer
Determine & manage Chlorate levels in Georgetown & Forsayth & manage.	5	Med	Sample for chlorate more often (at least twice yearly). Monitor and develop options to manage chlorate production.	End 2015	We have added testing for chlorate to our schedule on a quarterly basis and are monitoring results.	Complete	Facilities Overseer
Turbidity rises at Forsayth WTP which may effect disinfection.	6	High	Development of options for reduction of turbidity and maintaining minimum chlorine levels.	End 2014	We have engaged water treatment specialists to provide in-house staff training. Staff now carry out regular jar testing which has made a difference. We have reduced turbidity issues in the retic	2017	Facilities Overseer

IP item	Action	Priority	Description Describe the deliverable and the scope	Original Target date/s	Progress	Target date/s	Responsibility
					at times and all E.coli testing has shown good results. We have replaced media in the filters. We have obtained a grant and are working towards a pre-filtration step before aeration and upgrades to the treatment plant.		
Loss of Forsayth water supply from structural failure at Big Reef Dam.	7	Med	Investigate water sourcing options or dam repairs/improvements.	End 2024	We are in the process of designing and applying for grants to build a new dam. We have obtained a grant to build a new dam.	End 2020	Council
Ongoing siltation & weed management at Big Reef Dam	8	High	Investigate resolving ongoing siltation and weed management problems at Big Reef Dam.	2020	We have designed a new dam. A grant has been obtained.	2020	Council
Loss of water supply through inadequate wet season	9	High	Investigate water sourcing options for supply security for Georgetown & Forsayth	2020	We have of designed a new dam. This dam will supply Forsayth with water and either supply Georgetown with piped water or water will be released to supply the existing wells.	2020	Council
Computer failure at Forsayth WTP.	10	High	Investigate computer upgrades & scada set up to deal with computer failure.	2015	We have obtained a grant to do this upgrade.	2018	Facilities Overseer & Council
Colilert water testing	11	Med	Investigate purchasing & using colilert water testing for E.coli.	End 2014	We have purchased this equipment and are working towards a clean environment area to perform tests.	2018	Facilities Overseer
Scada	12	Med	Investigate scada computer system specifically chlorine alarms	End 2014	We have done some investigations and added it to the budget however it failed to pass. Still working towards this.	End 2017	Facilities Overseer & Council
Water mains	13	Low	Investigate capital works projects to replace 80mm AC with PVC & extend mains with PVC to complete circuits.	2023	We have performed capital works jobs each year and eliminated some dead ends. We have funds in this budget to replace some AC pipe with PVC and remove a dead end. This is ongoing at this stage.	2023	Council

