GLADSTONE
REGIONAL COUNCIL

ABN: 27 330 979 106

DRINKING WATER QUALITY MANAGEMENT PLAN REPORT

2017/2018

SPID: 483

Gladstone Regional Council
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Glossary of terms

ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
E. coli	*Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
GRC	Gladstone Regional Council
GAWB	Gladstone Area Water Board
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
WTP	Water Treatment Plant
<	Less than
>	Greater than

1. Introduction

This report documents the performance of Gladstone Regional Council's (GRC) drinking water service with respect to water quality, and implementation of 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.

2. Overview of Operations

The Gladstone Regional Council provides water to its residents through four water schemes:

- **Lake Awoonga Scheme.** Under this scheme the Gladstone Area Water Board (GAWB) collects and treats raw water harvested from the Lake Awoonga Dam. The water is treated through a conventional water treatment plant before being sold to Gladstone Regional Council at a number of reservoir and supply points throughout Gladstone, Boyne Island, Tannum and Calliope. GRC distributes the water to approximately 22,616 connections.
- **Bororen Scheme.** GRC sources water from two production bores located to the west of Lagoon Creek within the Baffle Creek catchment. The groundwater is treated at the Bororen Water Treatment Plant (WTP) and disinfected before being reticulated to 86 connections within the Bororen Township.
- **Miriam Vale Scheme.** GRC sources water from Baffle Creek (~80%) and the Thornes Road bore. The water is mixed and treated through a conventional treatment process and disinfected before being reticulated to approximately 200 connections.
- **Agnes Water/1770 Scheme.** GRC sources water from seawater and groundwater bores along Springs Road. The seawater is treated through a reverse osmosis desalination plant, and the bore water is treated through a conventional filtration plant. Disinfected water is supplied to approximately 860 connections within the townships of Agnes Water and 1770. The treatment plant is operated and maintained under contract by Trility Pty Ltd.

GRC manages drinking water quality through an approved Drinking Water Quality Management Plan (DWQMP). This ensures that water supplied to its 23,761 total connections, which represents an estimated population of 60,899 is safe and public health is maintained.

3. Compliance with water quality criteria for drinking water

A summary of water quality performance over the four schemes is summarised in Appendix A.

GRC have produced a consistent and safe water supply that meet the requirements set by the *Public Health Regulation 2018* for drinking water with 100% of the 868 samples tested free of *E. coli*.

The physical and chemical testing program included over 13,000 individual tests with only 2 results not meeting water quality criteria, demonstrating a 99.98% compliance with applicable health guideline values stated in the *Australian Drinking Water Guidelines 2011* for the parameters tested.

Two bromate results in the Lake Awoonga scheme exceeded the ADWG lifetime exposure health guideline of 0.02mg/L, with the highest result being 0.046mg/L. The average result for the scheme was 0.001mg/L, which is significantly below the lifetime exposure guideline value.

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

There were two (2) instances during 2017-18 where the Regulator was notified under sections 102 or 102A of the Act.

PRESCRIBED INCIDENTS OR EVENTS AND CORRECTIVE AND PREVENTIVE ACTIONS UNDERTAKEN.

DWI-7-483-00017 - Event

Incident Description:

On 23/11/2017 GRC Water Services staff discovered that the NRG Reservoir access ladder and Telstra fence was damaged, and the walls of the Reservoir had been graffitied.

Investigation and Cause:

- Reservoir isolated from the reticulation network;
- QPS contacted;
- Water sample collected, in-situ physical parameters and *E. coli* analysis performed and
- Sample dispatched to ALS for further testing. No exceedances identified from in-situ monitoring;
- *E. coli* analysis conducted in GRC's on-site lab compliant with the ADWG 2011;
- No exceedances with the ADWG 2011 identified in the results received from ALS

Corrective and Preventative Actions:

- Conducted a thorough assessment of the Reservoir with a Drone, which established that the hatches had not been compromised and were still locked;
- Conducted an assessment of the Reservoir with a Elevated Platform which confirmed what the Drone footage had indicated that the hatches had not been accessed;
- Council is currently investigating long-term security solutions for Reservoirs

NON-COMPLIANCES WITH THE WATER QUALITY CRITERIA AND CORRECTIVE AND PREVENTIVE ACTIONS UNDERTAKEN

DWI-7-483-00016- Noncompliance with Water Quality Criteria

Incident Description:

During routine monitoring in March 2018 it was identified that there were exceedances in Bromate levels in the Lake Awoonga Scheme within the Clinton Park Reservoir Zone and at the Wurdong Reservoir. Both these Reservoirs are fed by the Gladstone WTP which is operated by the Gladstone Area Water Board (GAWB).

Investigation and Cause:

- This is likely due to bromine within Lake Awoonga, but the source has not been identified.

Corrective and Preventative Actions:

- Continue to investigate causes and possible management options.

5. Customer complaints related to water quality

Gladstone Regional 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 1 - Complaints Relating to Water Quality

Scheme	Suspected Illness	Discoloured water	Taste and Odour	Other	Total
Lake Awoonga Scheme	4	15	9	2	30
Agnes Water/1770 Scheme	1	0	1	0	2
Miriam Vale Scheme	0	2	1	0	3
Bororen Scheme	0	1	0	0	1
Total	**5**	**18**	**11**	**2**	**36**

Suspected Illness

Gladstone Regional Council investigates each complaint relating to alleged illness from our water quality, typically by conducting *E. coli* analysis from the source tap and monitoring the levels of free chlorine present in the water.

During 2017/2018, there were no confirmed cases of illness arising from the water supply system.

Discoloured water

A total of eighteen (18) customer complaints were received related to discoloured water. In response to discoloured water complaints, Council staff flush the relevant mains until the water runs clear. Council staff also makes contact with the customer to advise them of the actions taken. Council proactively flushes mains on a routine basis in areas with a history of discoloured water complaints. This has reduced the number of complaints received in the past year.

It is standard practice for Council to flush mains after breaks and in response to abnormal water quality sample results and low residual free chlorine.

Taste and odour

Gladstone Regional Council investigates taste and odour complaints and devise plans for prompt resolution, which may include flushing the reticulation system. Investigation of each complaint found no public health risks. The taste and odour complaints are possibly due to variations in chlorine concentration throughout the year and or due to operational changes (i.e. setpoint increase).

6. Findings and recommendations of the DWQMP auditor

GRC engaged an external auditor to conduct a regular audit of the DWQMP, which was required under the approval notice to be conducted by 1 November 2017.

The audit took place on the 6th, 7th and 8th of September 2017.

The auditor noted five non-compliances with the DWQMP. These included:

- Scheme and infrastructure descriptions had changed since the creation of the plan;
- Some preventive measures listed in the plan were not fully implemented;
- Critical control point procedures had been developed but were not in use;
- Operational monitoring had changed over time (in most cases, more monitoring was being undertaken);
- Verification monitoring was not fully implemented

Although there were the non-conformances summarised above, the auditor also made the overall statement:

In the auditor's opinion, a high level of professionalism and commitment to provision of safe drinking water was evident at GRC; and the issues noted in this report relate primarily to the compliance with, and relevance of the approved DWQMP compared with current circumstances and operations. Although the approved DWQMP was out of date and not fully implemented, GRC and Trility were observed to be approaching industry best practice in many areas.

The auditor made a number of recommendations and improvement opportunities, most of which were addressed through a comprehensive review and update of the GRC DWQMP. The review is discussed below.

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

Under the DWQMP approval notice, a review was required by 1 May 2018. Following the DWQMP audit, GRC engaged an external consultant to assist with the review. The review included:

- Full risk assessment review
- Development of new critical control points and procedures
- Assessment and interpretation of all available water quality data
- Development of new system schematics
- Review and amendment of operational and verification monitoring programs

The review was completed by 1 May 2018 and led to the development of a new DWQMP. This amendment was submitted to DNRME under a DWQMP Amendment Application, on 12 June 2018. The amended DWQMP was approved on 30 November 2018.

8. Actions taken to implement the DWQMP

For the 2017-18 financial year, GRC was operating under its old DWQMP; but simultaneously undertaking a comprehensive review and update of the plan.

Because of this major change, limited progress was made against the commitments in the old DWQMP.

Although the new plan was not approved until November 2018, GRC undertook a number of actions that were identified through the review process.

These included:

- Improvements to our water quality monitoring programs
- Review of the Agnes Water Desalination Plant, and implementation of improvement actions
- Implementation of Critical Control Point procedures
- Development of operational procedures
- Implementation of automated filter rotation at Bororen WTP
- Establishment of routine Drinking Water Technical Committee meetings (in collaboration with Gladstone Area Water Board)

Now that the amended DWQMP has been approved, we will progress with the implementation of the identified improvement actions.

Appendix A – Summary of compliance with water quality criteria

The results from the verification monitoring program have been compared against the water quality criteria specified by the Regulator in the *DWQMP Amended Information Notice for the Decision (November 2018)*

Verification monitoring results - Lake Awoonga Scheme - Reticulation System

Parameter	Unit of Measure	Sample Results	Minimum	Average	Maximum	Non-compliances*
Alkalinity	mg/L as CaCO3	131	22	64	87	0
Aluminium	mg/L	131	0.012	0.058	0.27	0
Antimony	mg/L	12	ND	ND	ND	0
Arsenic	mg/L	12	ND	ND	ND	0
Barium	mg/L	12	ND	0.008	0.01	0
Boron	mg/L	12	ND	ND	ND	0
Bromate	mg/L	243	ND	0.001	0.046	2
Bromide	mg/L	240	ND	0.017	0.78	0
Bromodichloromethane	mg/L	133	ND	0.019	0.029	0
Cadmium	mg/L	12	ND	ND	ND	0
Chlorate	mg/L	129	ND	0.26	1.0	0
Chloride	mg/L	235	20.0	24.6	203	0
Chlorine (free)	mg/L	777	ND	0.90	2.8	0
Chromium	mg/L	12	ND	ND	0.002	0
Copper	mg/L	12	ND	0.008	0.021	0
Dibromochloromethane	mg/L	133	ND	0.010	0.080	0
Dissolved Oxygen	mg/L	20	8.3	8.4	8.7	0
E. coli	mpn/100mL	650	ND	ND	ND	0
Electrical Conductivity	µS/cm	763	229	275	447	0
Fluoride	mg/L	50	ND	0.07	0.16	0
HPC	cfu/mL	232	ND	16	660	0
Iron	mg/L	131	ND	0.005	0.21	0
Lead	mg/L	12	ND	ND	0.002	0
Manganese	mg/L	131	ND	ND	0.028	0
Manganese (Soluble)	mg/L	128	ND	ND	0.04	0
Mercury	mg/L	12	ND	ND	ND	0
Molybdenum	mg/L	12	ND	ND	ND	0
Nickel	mg/L	12	ND	ND	ND	0
Nitrate	mg/L	240	ND	0.16	0.61	0
Nitrite	mg/L	238	ND	ND	0.16	0
pH		763	7.0	7.7	11.1	0
Phosphate	mg/L	238	ND	ND	0.04	0
Selenium	mg/L	12	ND	ND	ND	0
Sulfate	mg/L	239	ND	27.4	38.6	0
Temperature	°C	758	13.6	26.3	35.2	0
Total Coliforms	mpn/100mL	649	ND	ND	51	0
Total Hardness	mg/L	131	23	66	102	0
Total Trihalomethanes	mg/L	16	0.025	0.059	0.096	0
Tribromomethane	mg/L	133	ND	ND	0.057	0
Trichloromethane	mg/L	133	0.01	0.038	0.085	0
True Colour	HU	762	ND	ND	20	0
Turbidity	NTU	765	0.02	0.17	3.44	0
Zinc	mg/L	12	ND	0.006	0.019	0

*Non-compliances refers to non-compliances with the regulatory water quality criteria
ND = Not detected (or below limit of reporting)

Verification monitoring results - Bororen Scheme - Reticulation System

Parameter	Unit of Measure	Sample Results	Minimum	Average	Maximum	Non-compliances
Alkalinity	mg/L as CaCO3	23	204	221	231	0
Aluminium	mg/L	52	ND	0.21	3.1	0
Antimony	mg/L	3	ND	ND	ND	0
Arsenic	mg/L	3	ND	ND	ND	0
Barium	mg/L	3	0.019	0.020	0.020	0
Boron	mg/L	3	ND	0.03	0.09	0
Bromate	mg/L	9	ND	ND	ND	0
Bromide	mg/L	9	0.067	0.19	0.58	0
Bromodichloromethane	mg/L	21	ND	0.005	0.014	0
Cadmium	mg/L	3	ND	ND	ND	0
Chlorate	mg/L	20	ND	0.33	0.45	0
Chloride	mg/L	8	146	151	154	0
Chlorine (free)	mg/L	54	1.2	1.6	2.0	0
Chromium	mg/L	3	ND	ND	ND	0
Copper	mg/L	3	ND	0.001	0.003	0
Dibromochloromethane	mg/L	21	ND	0.013	0.024	0
Dissolved Oxygen	mg/L	2	8.2	8.4	8.5	0
E. coli	mpn/100mL	19	ND	ND	ND	0
Electrical Conductivity	µS/cm	55	420	851	908	0
Fluoride	mg/L	4	ND	0.11	0.2	0
HPC	cfu/mL	14	ND	ND	2	0
Iron	mg/L	53	ND	0.038	0.67	0
Lead	mg/L	3	ND	ND	ND	0
Manganese	mg/L	53	ND	0.025	0.16	0
Manganese (Soluble)	mg/L	53	ND	0.004	0.039	0
Mercury	mg/L	3	ND	ND	ND	0
Molybdenum	mg/L	3	ND	ND	ND	0
Nickel	mg/L	3	ND	ND	ND	0
Nitrate	mg/L	9	ND	0.02	0.06	0
Nitrite	mg/L	9	ND	ND	0.02	0
Pesticides	mg/L	1	ND	ND	ND	0
pH		55	7.5	7.7	8.0	0
Phosphate	mg/L	9	ND	ND	0.01	0
Selenium	mg/L	3	ND	ND	ND	0
Sulfate	mg/L	9	2	3.3	4.1	0
Temperature	°C	54	19.6	25.8	35.9	0
Total Coliforms	mpn/100mL	19	ND	ND	17	0
Total Hardness	mg/L	23	42	288	317	0
Total Trihalomethanes	mg/L	2	0.018	0.023	0.027	0
Tribromomethane	mg/L	21	ND	0.014	0.100	0
Trichloromethane	mg/L	21	ND	ND	ND	0
True Colour	HU	55	ND	1.1	9	0
Turbidity	NTU	54	0.08	0.62	3.6	0
Zinc	mg/L	3	ND	0.002	0.005	0

*Non-compliances refers to non-compliances with the regulatory water quality criteria
ND = Not detected (or below limit of reporting)

Verification monitoring results - Miriam Vale Scheme - Reticulation System

Parameter	Unit of Measure	Sample Results	Minimum	Average	Maximum	Non-compliances
Alkalinity	mg/L as CaCO3	39	74	92	115	0
Aluminium	mg/L	72	ND	0.11	0.81	0
Antimony	mg/L	1	ND	ND	ND	0
Arsenic	mg/L	1	ND	ND	ND	0
Barium	mg/L	1	0.016	0.016	0.016	0
Boron	mg/L	1	0.07	0.07	0.07	0
Bromate	mg/L	15	ND	0.001	0.014	0
Bromide	mg/L	15	ND	0.04	0.13	0
Bromodichloromethane	mg/L	38	0.007	0.018	0.03	0
Cadmium	mg/L	1	ND	ND	ND	0
Chlorate	mg/L	34	0.271	0.48	0.6	0
Chloride	mg/L	15	65	83	101	0
Chlorine (free)	mg/L	81	0.27	1.3	2.0	0
Chromium	mg/L	1	ND	ND	ND	0
Copper	mg/L	1	0.016	0.016	0.016	0
Dibromochloromethane	mg/L	38	0.013	0.023	0.035	0
Dissolved Oxygen	mg/L	4	8.6	9.0	9.3	0
E. coli	mpn/100mL	53	ND	ND	ND	0
Electrical Conductivity	µS/cm	80	354	458	596	0
Fluoride	mg/L	4	ND	ND	ND	0
HPC	cfu/mL	19	ND	ND	2	0
Iron	mg/L	72	ND	0.034	0.66	0
Lead	mg/L	1	ND	ND	ND	0
Manganese	mg/L	72	ND	0.020	0.19	0
Manganese (soluble)	mg/L	72	ND	0.001	0.046	0
Mercury	mg/L	1	ND	ND	ND	0
Molybdenum	mg/L	1	ND	ND	ND	0
Nickel	mg/L	1	ND	ND	ND	0
Nitrate	mg/L	15	0.1	0.14	0.19	0
Nitrite	mg/L	15	ND	ND	0.11	0
pH		81	6.9	7.5	7.9	0
Phosphate	mg/L	15	ND	ND	ND	0
Selenium	mg/L	1	0.01	0.01	0.01	0
Sulfate	mg/L	15	2	2.9	4.2	0
Temperature	°C	80	18.6	24.7	31.5	0
Total Coliforms	mpn/100mL	53	ND	ND	ND	0
Total Hardness	mg/L	38	75	88	128	0
Total Trihalomethanes	mg/L	3	ND	0.037	0.056	0
Tribromomethane	mg/L	38	ND	0.007	0.050	0
Trichloromethane	mg/L	38	ND	0.013	0.070	0
True Colour	HU	81	ND	2.6	21	0
Turbidity	NTU	81	0.07	0.41	5.6	0
Volatile organic compounds	mg/L	1	ND	ND	ND	0
Zinc	mg/L	1	0.006	0.006	0.006	0

*Non-compliances refers to non-compliances with the regulatory water quality criteria
ND = Not detected (or below limit of reporting)

Verification monitoring results - Agnes Water/1770 - Reticulation System

Parameter	Unit of Measure	Sample Results	Minimum	Average	Maximum	Non-compliances
Alkalinity	mg/L as CaCO3	22	40	50	62	0
Aluminium	mg/L	23	0.04	0.06	0.10	0
Antimony	mg/L	4	ND	ND	ND	0
Arsenic	mg/L	4	ND	ND	0.001	0
Barium	mg/L	4	0.006	0.007	0.008	0
Boron	mg/L	4	1.1	1.2	1.2	0
Bromate	mg/L	27	ND	0.001	0.013	0
Bromide	mg/L	27	0.33	0.48	0.67	0
Bromodichloromethane	mg/L	23	ND	ND	ND	0
Cadmium	mg/L	4	ND	ND	ND	0
Chlorate	mg/L	23	ND	0.15	0.60	0
Chloride	mg/L	26	129	165	211	0
Chlorine (free)	mg/L	100	0.37	0.76	1.8	0
Chromium	mg/L	4	ND	ND	ND	0
Copper	mg/L	4	0.003	0.007	0.017	0
Dibromochloromethane	mg/L	23	ND	0.001	0.008	0
Dissolved Oxygen	mg/L	3	8.9	9.0	9.2	0
E. coli	mpn/100mL	146	ND	ND	ND	0
Electrical Conductivity	µS/cm	98	504	626	830	0
Fluoride	mg/L	4	ND	ND	ND	0
HPC	cfu/mL	30	ND	1	6	0
Iron	mg/L	23	ND	0.013	0.12	0
Lead	mg/L	4	ND	ND	ND	0
Manganese	mg/L	23	ND	0.002	0.005	0
Manganese (Soluble)	mg/L	23	ND	ND	ND	0
Mercury	mg/L	4	ND	ND	ND	0
Molybdenum	mg/L	4	ND	ND	ND	0
Nickel	mg/L	4	ND	ND	ND	0
Nitrate	mg/L	27	0.06	0.09	0.12	0
Nitrite	mg/L	27	ND	ND	0.01	0
pH		102	7.1	8.1	8.4	0
Phosphate	mg/L	27	ND	ND	0.01	0
Selenium	mg/L	4	ND	ND	0.01	0
Sulfate	mg/L	26	2.0	3.1	5.0	0
Temperature	°C	96	20.7	27.9	34.1	0
Total Coliforms	mpn/100mL	146	ND	ND	3	0
Total Hardness	mg/L	23	39	48	58	0
Total Trihalomethanes	mg/L	3	0.018	0.045	0.061	0
Tribromomethane	mg/L	23	0.017	0.036	0.061	0
Trichloromethane	mg/L	23	ND	ND	ND	0
True Colour	HU	102	ND	ND	6	0
Turbidity	NTU	102	0.1	0.33	1.3	0
Zinc	mg/L	4	ND	0.007	0.023	0

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ND = Not detected (or below limit of reporting)