Drinking Water Quality Management Plan Report (DWQMP) 2020 – 2021

Bulloo Shire Council
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Construction of Water Cooling Plant – Secondary Cooling System

Storage tanks and shed that houses the Heat Exchange Unit.

Thargomindah's Heat Exchange Unit – the secondary cooling system.

Contents

Glossary of terms

ADWG 2011	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
DNRME	Department of Natural Resources, Mines and Energy
DWQMP	Drinking Water Quality Management Plan
E. coli	*Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk
The Regulator	Department of Natural Resources, Mines and Energy
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 Bulloo 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 goal of the DWQMP is the protection of public health through the identification and minimisation of any public health related risks associated with drinking water. The DWQMP for Bulloo Shire Council was approved by the Queensland Water Supply Regulator, Department of Regional Development, Manufacturing and Water (QWSR, RDMW) in May 2021.

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

Bulloo Shire incorporates the towns of Thargomindah and Hungerford, and covers an expanse of 73,807.6km^2. The population within the shire is approximately 377. Thargomindah is the administration centre of the Shire with the adjoining Shires being Barcoo, Quilpie and the Paroo. The Bulloo Shire is approximately 1,004km west of Brisbane and 197km west of Cunnamulla.

The Bulloo Shire Council is a small drinking water service provider as defined under the Act and provides drinking water to a population of approximately 270 people. Reticulated water supply is provided to both Thargomindah and Hungerford, with a potable supply to Thargomindah by artesian supply, Hungerford receives a non-potable supply from a sub-artesian supply. The Bulloo Shire Council is responsible for the following supply schemes:

Thargomindah

- The potable Supply delivered to Thargomindah is sourced from the Hooray aquafer. The town water is sourced from a depth of 820 metres in the Great Artesian Basin at a temperature of approximately 72^{o}C. The bore was drilled in 1999 to a depth of 820 metres and was fully commissioned in 2001. The bore has a steel casing for its full depth with perforated or slotted casing for the last 96 metres.
- The bore water flows out under pressure and a pressure reducing valve at the bore decreases the natural pressure from 100m to a 45m head. The bore water then flows into two cooling ponds, in parallel, where it circulates through an array of copper pipes to allow the heat of the bore water to be transferred to the pond water.
- The copper pipes in each of the cooling ponds is made up of two 150mm diameter manifolds with eight (8) parallel 50mm diameter copper lines submerged in the cooling pond water travelling back and forwards three (3) times within the pond prior to exiting the ponds to the Thargomindah Heat Exchange Unit.
- The cooling pond system is completely closed with pressure being provided by the bore. The design flow for sizing the cooling pipe system was 16L/s. The cooled bore water from

the copper pipes then flows from the cooling ponds to the heat exchange system before entering the town reticulation network. The cooled water from the cooling ponds is not treated or disinfected in any way.

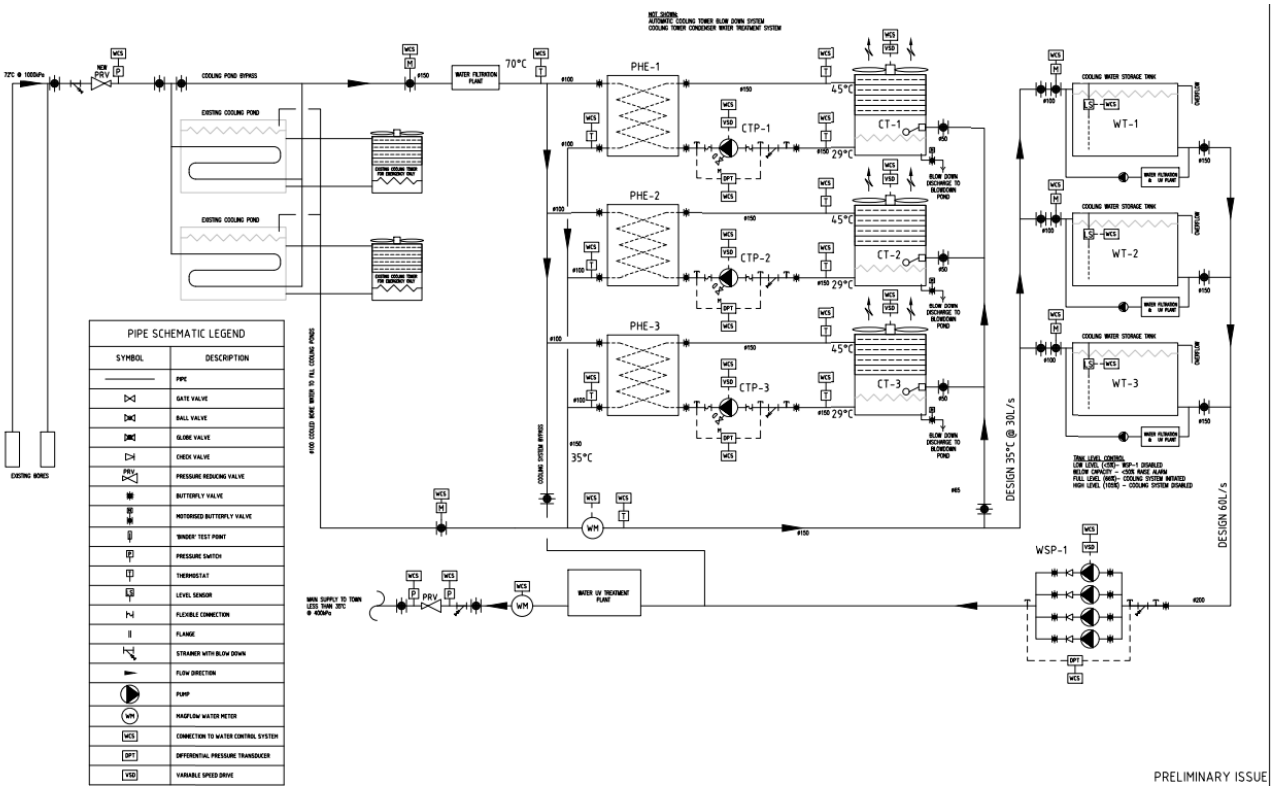
- The Cooling Plant System cools water supplied by the bore (either directly from the bore or from the bore via the existing cooling ponds. The cooling process is performed via Plate Heat Exchangers located in the WCS shed. The Plate Heat Exchangers medium cooling circuit is a short water-cooling loop made up of Cooling tower, variable speed pump and Heat exchanger. The heat exchanger medium is cooled through this circuit via the cooling towers at a certain flow and returned to the plate heat exchanger with the use of a CT pump. The cooling towers consist of variable speed fans that modulate and the return temperature to the heat exchanger. There are 3 of these individual circuits. All Bore water (town supply water) is directed through the hot side of the plate heat exchangers in a parallel arrangement.
- Once the water passes through the plate heat exchangers the cooler water is directed either into the tanks outside the shed (these are also in parallel arrangement and should always display the same or very close to the same level), OR directly to the town supply manifold where the water is directed to town. The direction of the water at this point is determined by the tanks capacity and the bore water temperature entering the plate heat exchanges at the time. Generally, this scenario will be somewhat seasonal as during the cooler months the bore supply water temp may be significantly lower.
- If the cooled water fills the tanks, the water is stored in these tanks and is the towns water supply when required. There is a main supply pump manifold that maintains town pressure to the town as required.
- In line of the water supplied to town is a UV filter that is enabled if flow is detected. This will treat the water with means of UV lamps.
- There is an emergency shut off valve installed on the main town manifold and in the event that any water supplied to the manifold either from the new cooling system or the existing cooling ponds arrangement, shuts off at a preset temperature set by the Water Management System (WMS).
- The System is connected to the Grid Network and is in parallel with onsite embedded generation which consists of a battery storage inverter and roughly 240kW of ground mount solar. The system is design to have enough stored electrical capacity to run the supply water pumps if the solar is not available and the batteries are not being recharged. Otherwise very little grid power should be required. Cooling of the water is generally provided during the day when the solar is available or at short periods at the end of the day when the battery capacity allows

- Details of the pipes in the reticulation system are as follows:

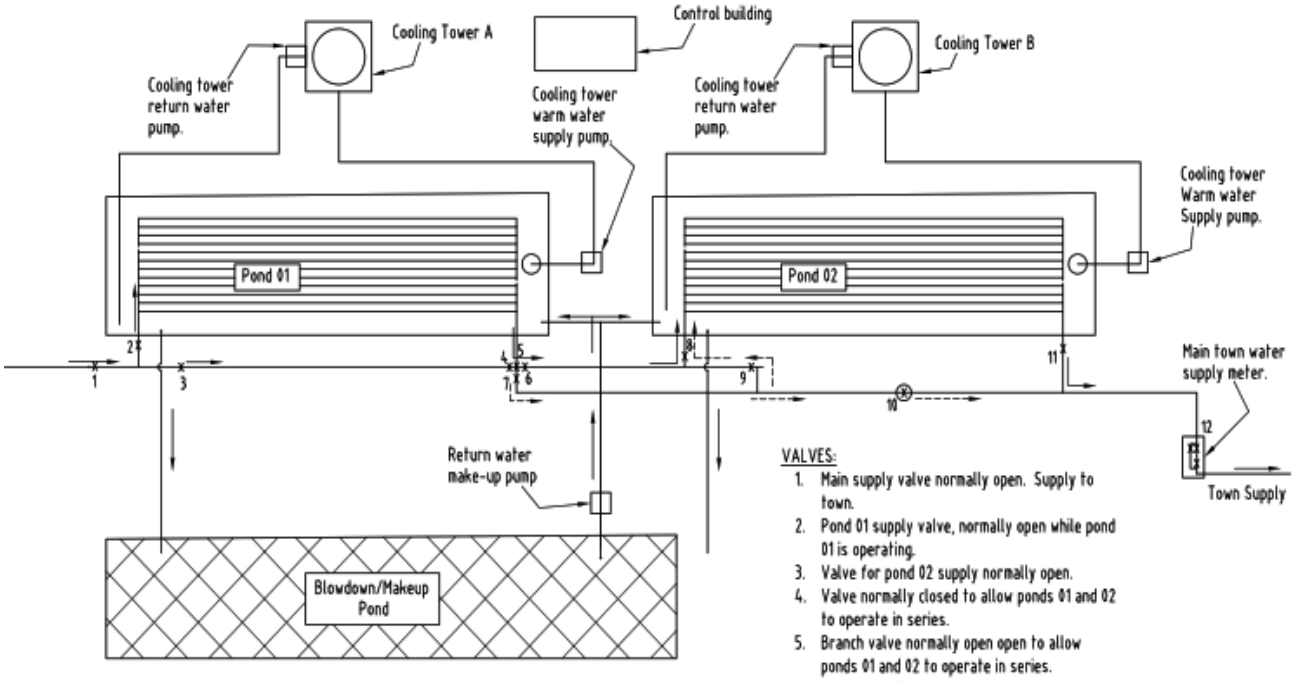
Material	**Length**
100mm Copper	821.6 metres
100mm PVC	5,665.2 metres
150mm PVC	769.7 metres
200mm PVC	893.4 metres
Total	**8,150 metres**

Table 1-1. Water Supply System and Infrastructure Details

COMPONENT		**Scheme 1**
Sources	Name	Bore 01
	Type	Artesian Bore
	% of supply	100
	Reliability	Excellent
	Water quality issues	Total Dissolved Solids, Fluoride, Sodium
	Bore discharge Temperature	72°C (Maximum)
Sourcing Infrastructure	Type (pumped/gravity/equipped bore/ etc.	Free Flowing Bore. Due to pressure reduction is required prior to entry into Town Reticulation.
	Description	Bore Depth - 820m approx
Sources that do not undergo treatment	Water is sourced from a deep bore and water quality information does not identify any water quality issues that require treatment.	
Sources that do not undergo disinfection	Water is from a deep artesian bore and flows directly into the reticulation system. Water quality information does not identify and water quality issues that require disinfection prior to supply.	
Distribution and Reticulation System	Pipe material	PVC
	Age range	16-28 years
	Approx. % of total length	100
	Areas where potential long detention periods could be expected	North-Western end of unnamed street off Frew Street
	Areas where low water pressure (e.g. <12m) could be expected during peak or other demand periods.	No Areas.



Schematic Layout of Thargomindah Cooling Ponds - Figure 2.2

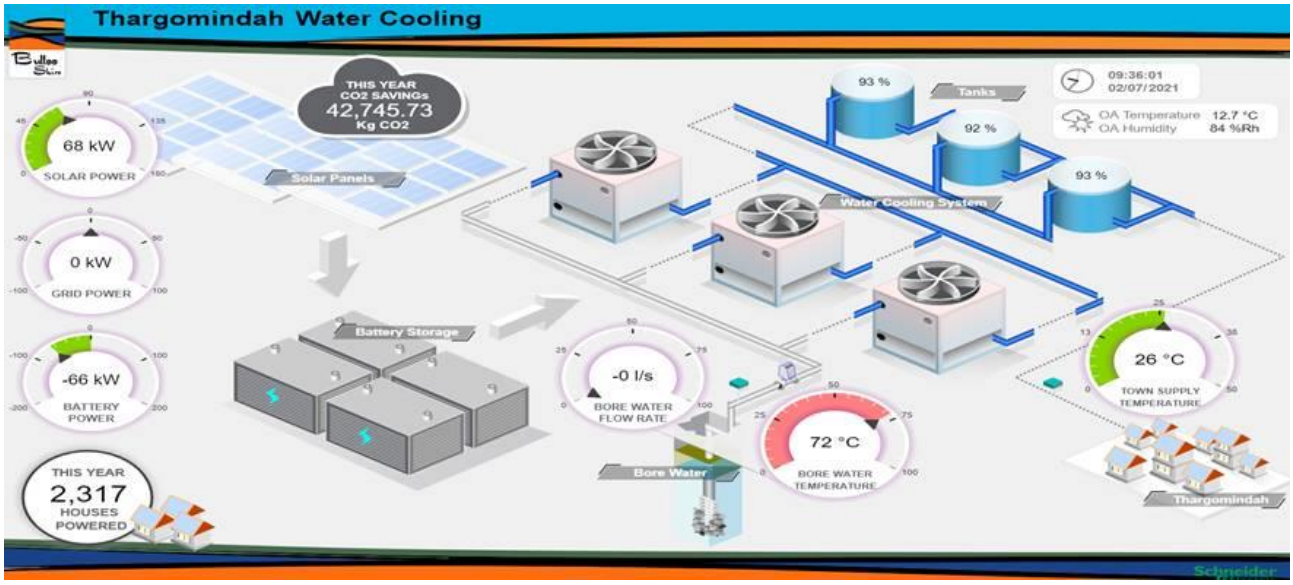


NOTES:

1. To allow ponds 01 & 02 to operate in series, with water passing from pond 01 through pond 02, the valves 2, 5,6,8 & 11, are required to be open, with valves 4,7 & 9, required to be closed.
2. To allow ponds 01 & 02 to operate in parallel, with town supply water passing separately through each, the valves 2, 3, 4 6, 7,8 10, 11 & 12, are required to be open, with valves 5,9 required to be closed.

VALVES:

1. Main supply valve normally open. Supply to town.
2. Pond 01 supply valve, normally open while pond 01 is operating.
3. Valve for pond 02 supply normally open.
4. Valve normally closed to allow ponds 01 and 02 to operate in series.
5. Branch valve normally open open to allow ponds 01 and 02 to operate in series.
6. Valve normally open unless maintenance is required on pond 02.
7. Valve normally closed unless maintenance is required on pond 02.
8. Pond 02 supply valve, normally open while pond 02 is operating
9. Secondary supply to pond 02 from pond 01.
10. Inline valve normally open.
11. Outlet valve from pond normally open.
12. Town supply control valve.



Hungerford

The Village of Hungerford has a twin supply to the Village. One supply is from a sub-artesian bore and the second is stored river water:

- The main supply is from a bore located approximately 6km from Hungerford on the Thargomindah/Hungerford Road and is classed as non-potable
  - The water is pumped from the bore by use of a solar bore pump into an onsite storage tank.
  - The water is pumped into Hungerford by the use of a transfer pump where it is collected into two (2) Poly Tanks with a combined storage capacity of approximately 44,000 litres.
  - Water is transferred to the reticulated supply for the residents of Hungerford by dual pumps.
  - Although there is no treatment carried out to the bore supply, testing has been carried out on the bore supply as the supply is mainly used by the residents inside the buildings of the village. (refer to test results attached)
- The second reticulated supply is from two storage dams that receive water during high river flows.
  - The stored river water is pumped to Hungerford and stored in a 40,000 litre Poly tank where it is pumped into an elevated Tank;
  - The elevated tank is the supply to the secondary reticulation and is used by the residents for watering their yards and gardens.

3 Actions taken to implement the DWQMP

Program actions.

Council, during 2016, arranged for the development of the DWQMP that was submitted to the Department for review and approval. The Bulloo Council, during the 2020-2021 reporting period, reviewed the DWQMP including risk assessment, improvement plan and water quality data.

4 Compliance with water quality criteria for drinking water

In 2020-2021, Bulloo Shire Council complied with all the water quality criteria as detailed in this report, with the exception of fluoride which is naturally occurring and is regularly above the ADWG health guideline. These results are reported to the Regulator.

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

This financial year there was zero (0) water quality incident reported to the Regulator under section 102 and 102A of the Act.

The Thargomindah primary, and only, source of water supply is from the Hooray aquafer high. As is common with all western towns whose primary source of supply is from the artesian basin, their supply will fail to meet the water quality criteria mean health guideline values in the most current Australian Drinking Water Guidelines, as well as the standards in the Public Health Regulation 2018.

Detection of Fluoride

Incident Description:

The Thargomindah bore water has long had levels of naturally occurring fluoride in the range of 1.6 to 1.9mg/L. This range of values is slightly above the ADWG value. Based on the above information, the levels of fluoride in the Thargomindah water supply are considered to be satisfactory.

Corrective and Preventive Actions:

In 2017 the Bulloo Shire Council conducted an intensive 3 months monitoring of fluoride in Thargomindah water supply. Even with an intensive monitoring and analysis, the fluoride result is very consistent and considered to be satisfactory.

6 Customer complaints related to water quality

Bulloo Shire Council did not receive any formal water quality complaints from its customers for the period.

Although there is a general acceptance of the quality of the supplied water within the township of Thargomindah, there is always a concern on the temperature supplied to the community during the summer months relating to the high temperature the water is being supplied to the residents during this period of time (in excess of 50^{o}C).

APPENDICES

Appendix A: Summary of compliance with water quality criteria.

The Bulloo Shire Council Amended Drinking Water Quality Management Plan (DWQMP) was approved by the Regulator on 14 May 2021.

The results from the verification monitoring program have been compared against levels of the Reporting Guidelines 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.

The Bulloo Shire Council has adopted a new record keeping system for all water and sewerage data which replaces all previous record keeping systems. This system is the SWIMLocal system created by ***qldwater*** – The Queensland Water Directorate. All data from previous years has been entered ensuring no loss of data will occur.

Appendix B: Water Quality Frequency Monitoring

Thargomindah Water

Location	Parameter	Suggested frequency after 6 months review from Nov 2016 (subject to adequate quality results)
Bore pre and post cooling ponds.	Fluoride	It is known that there is high fluoride in bore water. However, the results do not fluctuate and consistently exceed ADWG health guideline limits. Therefore, the frequency has been stretched out to 3 months.
	Radionuclides	Every 2 years and potentially less in the future
	Full metals suite	Every 12 months or event based
	Temperature	This must be done on-site in the field (not a laboratory measurement)
	pH	
	SAR	Every 6 months or event based
	EC	Every 6 months or event based
	Chloride	Every 12 months
	TDS	Every 12 months or event based
	Carbonate	Every 6 months or annually
	Hardness	Every 12 months or annually
	Nitrate	Every 12 months or event based
	Phosphorus	Every 12 months or event based
	Sulfate	Every 12 months or event based
	Langelier index	Every 12 months or event based
Reticulation	Fluoride	It is known that there is high fluoride in bore water. However, the results do not fluctuate and consistently exceed ADWG health guideline limits. Therefore, the frequency has been stretched out to 3 months.
	Full metals suite	Every 6 months or event based
	E. coli	Fortnightly in-house testing to be carried out using colilert, with samples cross checked with external lab quarterly. Where variation is noted external lab testing will recommence monthly for a period of three months without variation.
	HPC	
	Legionella	Positive results have been detected in past samples. Frequency can be reduced once *Legionella* is no longer detected.
	Temperature	This must be done on-site
	pH	

Location	Parameter	Suggested frequency after 6 months review from Nov 2016 (subject to adequate quality results)
	SAR	Every 6 months or event based
	EC	Every 6 months or event based
	Chloride	Every 12 months or event based
	TDS	Every 12 months or event based
	Carbonate	Every 12 months or event based
	Hardness	Every 12 months or annually
	Nitrate	Every 12 months or event based
	Phosphorus	Every 12 months or event based
	Sulfate	Every 6 months or annually
	Langelier index	Every 6 months or annually

Appendix C: Details of Compliance with water quality criteria

The following results were obtained from samples submitted for analysis.

Parameter	Scheme component	Name of Scheme Component	Laboratory Name	Unit of measure	Limit of reporting (LOR) for chemical parameters	Total number of samples taken	Number of samples exceeding health guideline value or in which pathogens were detected	Minimum concentration or count	Maximum concentration or count	Average (mean) concentration or count
Arsenic	R	Bore	Toowoomba Regional Council	mg/L	0.001	0	0			
Fluoride	R	Bore	Toowoomba Regional Council	mg/L	0.2	0	0			
pH	R	Bore	Toowoomba Regional Council	Units		2	N/A	8.4	8.5	8.45

Parameter	Scheme component	Name of Scheme Component	Laboratory Name	Unit of measure	Limit of reporting (LOR) for chemical parameters	Total number of samples taken	Number of samples exceeding health guideline value or in which pathogens were detected	Minimum concentration or count	Maximum concentration or count	Average (mean) concentration or count
Conductivity	R	Bore	Toowoomba Regional Council	µs/cm	1	2	N/A	1,020	1,060	1,040
Total Hardness	R	Bore	Toowoomba Regional Council	mg/L as $CaCO_3$	1	2	N/A	9	9	9
Total Alkalinity	R	Bore	Toowoomba Regional Council	mg/L as $CaCO_3$	2	2	N/A	457	474	465.5
Molybdate Reactive Silica	R	Bore	Toowoomba Regional Council	mg/L	1.0	2	N/A	39	40	39.5
Total Iron	R	Bore	Toowoomba Regional Council	mg/L	0.005	2	N/A	0.380	2.66	1.52
Total Manganese	R	Bore	Toowoomba Regional Council	mg/L	0.002	2	0	0.018	0.021	0.0195
Calcium	R	Bore	Toowoomba Regional Council	mg/L	0.03	2	N/A	3.41	3.51	3.46
Magnesium	R	Bore	Toowoomba Regional Council	mg/L	0.002	2	N/A	<0.042	0.046	0.044
Sodium	R	Bore	Toowoomba Regional Council	mg/L	0.5	2	N/A	254.0	260.0	257.0

Parameter	Scheme component	Name of Scheme Component	Laboratory Name	Unit of measure	Limit of reporting (LOR) for chemical parameters	Total number of samples taken	Number of samples exceeding health guideline value or in which pathogens were detected	Minimum concentration or count	Maximum concentration or count	Average (mean) concentration or count
Potassium	R	Bore	Toowoomba Regional Council	mg/L	0.3	2	N/A	4.2	4.2	4.2
Sulphate	R	Bore	Toowoomba Regional Council	mg/L as SO_4	5	2	0	<5.0	<5.0	<5.0
Chloride	R	Bore	Toowoomba Regional Council	mg/L	0.5	2	N/A	66.7	67.2	66.95
Nitrate	R	Bore	Toowoomba Regional Council	mg/L as NO_3	1	2	0	<1	<1	<1
Phosphate	R	Bore	Toowoomba Regional Council	mg/L as PO_4	0.02	2	N/A	<0.02	<0.02	<0.02
Temporary Hardness	R	Bore	Toowoomba Regional Council	mg/L as $CaCO_3$	1	2	N/A	9	9	9
Bicarbonate Alkalinity	R	Bore	Toowoomba Regional Council	mg/L as $CaCO_3$	1	2	N/A	449	458	453.5
Carbonate Alkalinity	R	Bore	Toowoomba Regional Council	mg/L as $CaCO_3$	2	2	N/A	8	16	12
Hydroxide Alkalinity	R	Bore	Toowoomba Regional Council	mg/L as $CaCO_3$	2	2	N/A	<2	<2	<2

Parameter	Scheme component	Name of Scheme Component	Laboratory Name	Unit of measure	Limit of reporting (LOR) for chemical parameters	Total number of samples taken	Number of samples exceeding health guideline value or in which pathogens were detected	Minimum concentration or count	Maximum concentration or count	Average (mean) concentration or count
Free Carbon Dioxide	R	Bore	Toowoomba Regional Council	mg/L	0.1	2	N/A	2.9	3.6	3.25
Total Dissolved Ions	R	Bore	Toowoomba Regional Council	mg/L	1	2	N/A	881	902	891.5
Total Dissolved Solids	R	Bore	Toowoomba Regional Council	mg/L	1	2	N/A	643	657	650
Figure of Merit	R	Bore	Toowoomba Regional Council		0.1	2	N/A	<0.1	<0.1	<0.1
Saturation Index	R	Bore	Toowoomba Regional Council			2	N/A	0	0.13	0.065
Residual Alkalinity	R	Bore	Toowoomba Regional Council	mq/L as $CaCO_3$		2	N/A	9.0	9.0	9.0
Sodium Adsorption Ratio	R	Bore	Toowoomba Regional Council		0.1	2	N/A	37.6	37.7	37.65

Compliance with *Public Health Regulation 2018* for Escherichia coli (*E. coli*) monitoring in the reticulation system

As detailed in the Thargomindah Drinking Water Quality Management Plan, Council currently uses the "Colilert" field test kits which allow "in-house" testing for *E.Coli*. Appropriate validation of the field tests through duplicate samples on a three-monthly basis has been undertaken. One of the samples was forwarded to the Toowoomba Regional Council NATA accredited laboratory and the results have been compared with the field test kit results.

E.coli Field Test Kit Results (Colilert)

Month of year	Number of samples collected each month	Results of samples collected in which *E.Coli* is detected		
		Most Probable Number (MPN)	95% Confidence Limits	
			Lower	Upper
July 2020	12	<1	0	0
August 2020	6	<1	0	0
September 2020	6	<1	0	0
October 2020	6	<1	0	0
November 2020	12	<1	0	0
December 2020	5	<1	0	0
January 2021		<1	0	0
February 2021		<1	0	0
March 2021		<1	0	0
April 2021		<1	0	0
May 2021		<1	0	0
June 2021		<1	0	0

Comparison Sample Results

Month	Number of samples collected	**Toowoomba Regional Council Laboratory**	**Results**		
July 2020	6	E.Coli - <1 CFU/100mL	MPN	95% Confidence Limit	
				Lower	Upper
			<1	0	0
October 2020	6	E.Coli - <1 CFU/100mL	MPN	95% Confidence Limit	
				Lower	Upper
			<1	0	0
February 2021	6	E.Coli - <1 CFU/100mL	MPN	95% Confidence Limit	
				Lower	Upper
			<1	0	0
April 2018	6	E.Coli - <1 CFU/100mL	MPN	95% Confidence Limit	
				Lower	Upper
			<1	0	0
				Lower	Upper
			<1	0	0

Appendix D: Overview of Water Quality Sampling and Analysis Manual

Overview:

This document has been prepared by GHD at the request of Bulloo Shire Council (Council) to provide guidance on:

- The methodology for the collection of water and wastewater quality samples in a structured way which demonstrates compliance with statutory reporting requirements
- Examples of field data collection sheets
- The submission process for samples for laboratory analysis
- The interpretation of the results

The development of this manual was triggered by the outcomes from the baseline water quality testing undertaken for the Thargomindah and Hungerford service areas in 2016 and the need identified to assist BSC with the formalisation and documentation of their water and wastewater monitoring.

Water monitoring

Sampling of water quality is required to be undertaken from the Thargomindah and Hungerford water network. Both of these networks are provided with water from untreated bore sources.

Water samples collected shall be sent to a NATA accredited laboratory for analysis, with sampling at the frequency and locations noted in this document.

The results of the water sampling will be used to assess compliance with water quality criteria for drinking water. Water quality criteria are from the Australian Drinking Water Guidelines (2011, updated in February 2016).

Sewerage monitoring

Sampling for sewerage effluent quality is required from the Thargomindah Sewage Treatment Plant (STP). The conditions stipulated in the Environmental Authority Permit No EPPR00545013 require the treated effluent to be tested at both the outlet to the treatment plant (STP effluent) and at a test point just prior to the discharge to land (STP irrigation effluent) to assess the suitability of this wastewater for irrigation at the Golf Club and/or Cemetery.

Sewerage samples collected shall be sent to a NATA accredited laboratory for analysis, with sampling at the frequency and locations noted in this document.

The results of the sewage effluent sampling will be used to assess compliance with sewerage effluent quality criteria in terms of the discharge permit conditions.

This document should be read in conjunction with the Bulloo Shire Council, Review of Water and Sewerage Systems, July 2016, Draft 0, to gain a full understanding of the extent of the water and sewerage schemes involved in this sampling program.

Appendix E: External Testing Results

BEING WATERWISE
TOOWOOMBA REGIONAL WATER
ABN 99 788 305 360
LABORATORY SERVICES
Shuttlewood Court Mt Kynoch Toowoomba Qld 4350
PO Box 3021
Toowoomba Village Fair Qld 4350
Email: labservices@toowoombaRC.qld.gov.au
T: 07 4688 6270 F: 07 4688 6299

TEST REPORT

Issued: 28/04/21

BATCH NO: 21/1738
RECEIVED: 19/04/21
APPROVED: 28/04/21

ORDER NO: 20149/2

REPORT NO: 190421-1738-1

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Neil Crotty

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	Pond 21/1738/1 16/04/2021 0800	In 21/1738/2 16/04/2021 0800	Out 21/1738/3 16/04/2021 0800
QP-KYN-002	Conductivity	uS/cm	1	3,160	1,060	1,020
QP-KYN-001	pH	pH unit		9.5	8.5	8.4
QP-ADM-016*	Total Hardness	mg/L $CaCO_3$	1	4.0	9.0	9.0
QP-KYN-015	Total Alkalinity	mg/L $CaCO_3$	2	1,560	474	457
QP-KYN-097	Calcium	mg/L	0.03	1.49	3.51	3.41
QP-KYN-097	Iron	mg/L	0.005	0.012	2.66	0.380
QP-KYN-097	Potassium	mg/L	0.03	10.9	4.2	4.2
QP-KYN-097	Magnesium	mg/L	0.002	0.066	0.046	0.042
QP-KYN-097	Manganese	mg/L	0.002	0.003	0.021	0.018
QP-KYN-097	Sodium	mg/L	0.5	860	260	254
QP-KYN-114	Chloride	mg/L	0.5	222	66.7	67.2
QP-KYN-114	Nitrate	mg/L	1	<1.0	<1.0	<1.0
QP-KYN-114	Sulphate	mg/L	5	<5.0	<5.0	<5.0
QP-KYN-090	Phosphate	mg/L PO_4	0.02	0.10	<0.02	<0.02
QP-KYN-090	Molybdate Reactive Silica	mg/L	1	105	39	40
QP-ADM-016*	Temporary Hardness	mg/L$CaCO_3$	1	4	9	9
QP-ADM-016*	Bicarbonate Alkalinity	mg/L $CaCO_3$	1	1,060	458	449
QP-ADM-016*	Carbonate Alkalinity	mg/L $CaCO_3$	2	506	16	8
QP-ADM-016*	Hydroxide Alkalinity	mg/L $CaCO_3$	2	<2	<2	<2
QP-ADM-016*	Free Carbon Dioxide	mg/L	0.1	0.7	2.9	3.6
QP-ADM-016*	Total Dissolved Ions	mg/L	1	2,690	902	881
QP-ADM-016*	Total Dissolved Solids	mg/L	1	2,140	657	643
QP-ADM-016*	Figure of Merit		0.1	<0.1	<0.1	<0.1

NATA Accredited Laboratory
Number 12009
Accredited for compliance with ISO/IEC 17025 - Testing

File Reference: S-002289 (External)
*not covered by NATA scope of accreditation
LOR = Limit of Reporting
If Measurement Uncertainty required refer to following hyperlink:
http://www.tr.qld.gov.au/environment-water-waste/water-supply-dams/water-treatment-testing/12052-water-analysis
"Derived" - Derived value.
Results apply to sample(s) as received at laboratory.

BEING WATERWISE
TOOWOOMBA REGIONAL WATER
ABN 99 788 305 360
LABORATORY SERVICES
Shuttlewood Court Mt Nyroch Toowoomba Qld 4350
PO Box 3021
Toowoomba Village Fair Qld 4350
Email: labservices@toowoombaRC.qld.gov.au
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ORDER NO: 20149/2

REPORT NO: 190421-1738-1

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	Pond 21/1738/1 16/04/2021 0800	In 21/1738/2 16/04/2021 0800	Out 21/1738/3 16/04/2021 0800
QP-ADM-016*	Saturation Index			1.26	0.13	0
QP-ADM-016*	Residual Alkalinity	meq/L $CaCO_3$		31.0	9.0	9.0
QP-ADM-016*	Sodium Adsorption Ratio		0.1	188	37.7	37.6
	Temperature on Arrival	°C		[NA]	24	[NA]

Comments
pH, Alkalinity, Nitrate and Sulphate were tested outside APHA preservation guidelines.

John Osment
Chemist

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http://www.tr.qld.gov.au/environment-water-waste/water-supply-dams/water-treatment-testing/12052-water-analysis
"Derived" - Derived value.
Results apply to sample(s) as received at laboratory.

BEING WATERWISE
TOOWOOMBA REGIONAL WATER
ABN 99 788 305 360
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TEST REPORT

Issued: 6/07/20

BATCH NO: 20/2616
RECEIVED: 2/07/20
APPROVED: 6/07/20

ORDER NO: 18391

REPORT NO: 020720-2616-1

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Wayne Mills

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T Bore 01 20/2616/1 1/07/2020 0848	T Post cool pond 20/2616/2 1/07/2020 0913	T New Caravan Park 20/2616/3 1/07/2020 1042	T old Caravan Park 20/2616/4 1/07/2020 0957
	Temperature on Arrival	°C		9	[NA]	[NA]	[NA]
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	<10	<10	20EST	<10
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	<1	<1	3	<1
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1	<1	<1

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T 131 Sams St 20/2616/5 1/07/2020 1018	T Old Hospital 20/2616/6 1/07/2020 0934
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	25EST	10EST
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	<1	<1
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1

Comments
Time period between sample collection & laboratory receival exceeds 24 hour guideline for microbiology samples.
EST - Estimated count
E.coli results comply with the Australian Drinking Water Guidelines 6 2011 (<1 cfu or MPN/100mL).
Enterococci results comply with the Australian Drinking Water Guidelines 6 2011 (<1 cfu/100mL).

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BEING WATERWISE
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TEST REPORT

Issued: 6/07/20

BATCH NO: 20/2616
RECEIVED: 2/07/20
APPROVED: 6/07/20

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Wayne Mills

ORDER NO: 18391

REPORT NO: 020720-2616-1

Daniel Bishop
Microbiologist

NATA Accredited Laboratory
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TEST REPORT

Issued: 20/10/20

BATCH NO: 20/4018
RECEIVED: 15/10/20
APPROVED: 20/10/20

ORDER NO: 91529/1

REPORT NO: 151020-4018-1

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Wayne Mills

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T-Bore-01 20/4018/1 14/10/2020 8.21	T-Post Cool Pond 20/4018/2 14/10/2020 8.43	T-New Caravan Park 20/4018/3 14/10/2020 9.51	T- Old Caravan Park 20/4018/4 14/10/2020 9.19
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	<10	<10	<10	<10
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1	<1	<1

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T-131- Sams Street 20/4018/5 14/10/2020 10.17	T- Old Hospital 20/4018/6 14/10/2020 9.02
	Temperature on Arrival	°C		14	[NA]
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	<10	45 EST
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	<1	<1
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1

Comments
EST - Estimated count
E.coli and Enterococci results comply with the Australian Drinking Water Guidelines 6 2011 (<1 cfu or MPN/100mL).

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"Derived" - Derived value.
Results apply to sample(s) as received at laboratory.

BEING WATERWISE
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TEST REPORT

Issued: 20/10/20

BATCH NO: 20/4018
RECEIVED: 15/10/20
APPROVED: 20/10/20

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Wayne Mills

ORDER NO: 91529/1

REPORT NO: 151020-4018-1

D. Bishop

Daniel Bishop
Microbiologist

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TOOWOOMBA REGIONAL WATER

TEST REPORT

Issued: 8/02/21

BATCH NO: 21/0736
RECEIVED: 4/02/21
APPROVED: 8/02/21

ORDER NO: 91529/1

REPORT NO: 040221-0736-1

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Neil Crotty

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T- Bore -01 21/0736/1 3/02/2021 0900	T - Post Cool Pond 21/0736/2 3/02/2021 0928	T - New Caravan Park 21/0736/3 3/02/2021 1041	T - Old Caravan Park 21/0736/4 3/02/2021 1028
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	10 EST	<10	<10	50 EST
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	NR	NR	NR	NR
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1	<1	<1
	Temperature on Arrival	°C		[NA]	[NA]	20	[NA]

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T -131 Sams Street 21/0736/5 3/02/2021 1117	T - Old Hospital 21/0736/6 3/02/2021 0950
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	<10	<10
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	NR	NR
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1

Comments
NR - No Result. Unable to report *Pseudomonas aeruginosa* results due to incubation temperature failure.
EST - Estimated count
E.coli and Enterococci results comply with the Australian Drinking Water Guidelines 6 2011 (<1 cfu or MPN/100mL).

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TEST REPORT

Issued: 8/02/21

BATCH NO: 21/0736
RECEIVED: 4/02/21
APPROVED: 8/02/21

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Neil Crotty

ORDER NO: 91529/1

REPORT NO: 040221-0736-1

Daniel Bishop
Microbiologist

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TEST REPORT

Issued: 28/04/21

BATCH NO: 21/1811
RECEIVED: 22/04/21
APPROVED: 28/04/21

ORDER NO: 20149/2

REPORT NO: 220421-1811-1

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Neil Crotty

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T- Bore-01 21/1811/1 21/04/2021 0802	T- Post Cool Pond 21/1811/2 21/04/2021 0824	T- New Caravan Park 21/1811/3 21/04/2021 0927	T- Old Caravan Park 21/1811/4 21/04/2021 0910
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	<10	<10	1,400	990
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	<1	<1	<1	<1
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1	<1	<1
	Temperature on Arrival	°C		[NA]	[NA]	14	[NA]
Client*	Temperature-Client	°C		61.8	30.8	29.2	28.9

METHOD	Client Reference: Laboratory Reference: Sample Date: Sample Time: ANALYSIS	UNITS	LOR	T-131-Sams Street 21/1811/5 21/04/2021 1008	T- Old Hospital 21/1811/6 21/04/2021 0842
QP-KYN-051	Heterotrophic Plate Count	CFU/mL	1	700	920
QP-KYN-105	Total Coliforms	MPN/100mL	1	<1	<1
QP-KYN-105	*E.coli*	MPN/100mL	1	<1	<1
QP-KYN-106	*Pseudomonas aeruginosa*	MPN/100mL	1	<1	<1
QP-KYN-057	Enterococci	CFU/100mL	1	<1	<1
Client*	Temperature-Client	°C		30.9	31.0

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TEST REPORT

Issued: 28/04/21

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APPROVED: 28/04/21

CLIENT: The Chief Executive Officer
Bulloo Shire Council (801596)
68 Dowling Street
Thargomindah QLD 4492
ATTENTION: Neil Crotty

ORDER NO: 20149/2

REPORT NO: 220421-1811-1

Comments

E.coli and Enterococci results comply with the Australian Drinking Water Guidelines 6 2011 (<1 cfu or MPN/100mL).

D. Bishop

Daniel Bishop
Microbiologist

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