Drinking Water Quality Management Plan

McKinlay Shire Council
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SPID: 00084

Document Control						
Rev	**Description**	**Author**	**Reviewer**	**Approved For Issue**		
				Name	**Signature**	**Date**
0.1	Draft Review	P Murphy	M Pellow			22/10/2020
0.2	Draft with amendments	P Murphy	M Pellow			30/10/2020
0.3	Final Issue	P Murphy	M Pellow	P Murphy		09/11/2020
0.4	Amendment	M Pellow	C Scott	M Pellow		16/09/2022

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1 Registered Service Details

McKinlay Shire Council (MSC) is the registered service provider and has been allocated Service Provider Number SPID84.

The Service Provider name and contact details are summarised below:

Chief Executive Officer	
Telephone	(07) 4746 4201
Facsimile	(07) 4746 7549
Email	ceo@mckinlay.qld.gov.au
Postal Address	PO Box 177 JULIA CREEK QLD 4823

McKinlay Shire Council (MSC) is responsible for the management of four (4) water supply systems:

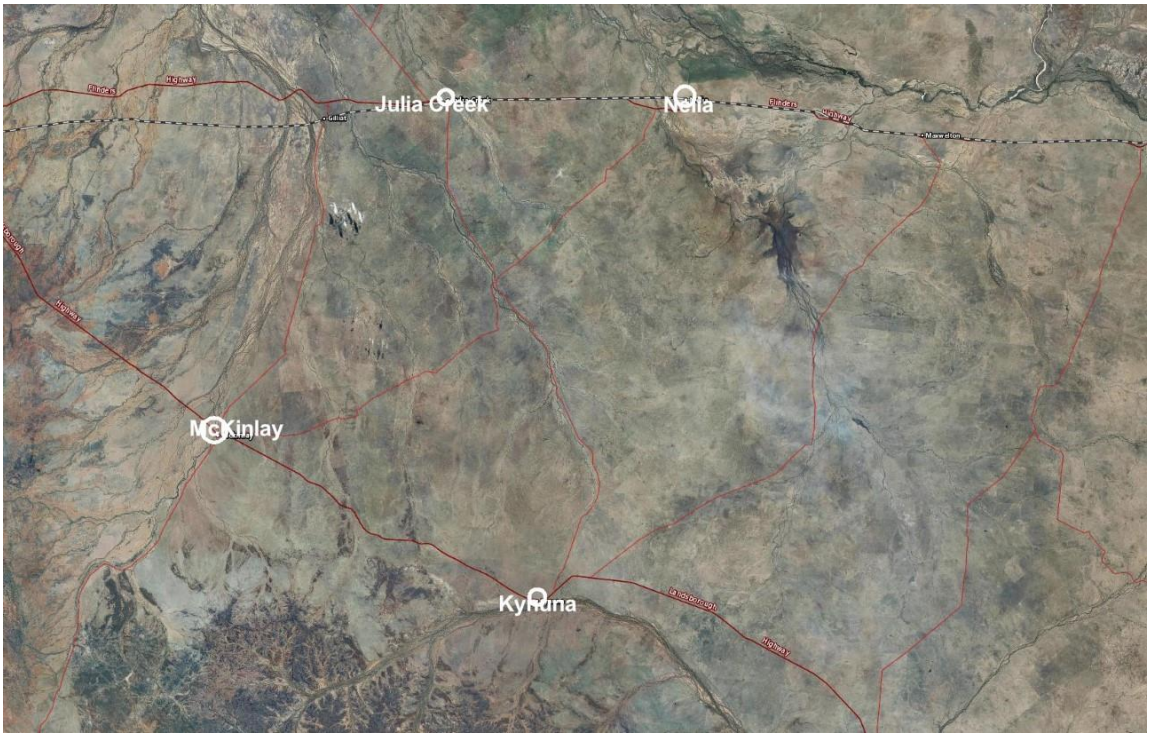
- Julia Creek
- McKinlay
- Kynuna
- Nelia

The following towns are serviced by the associated named water supply schemes:

- **Julia Creek** – Julia Creek has a population of approximately 511 persons (*2016 Census*). Population numbers increase during the months commencing April through until September.
- **McKinlay** – McKinlay has a population of approximately 12 persons. Population numbers can increase during the months commencing April through until September.
- **Kynuna** – Kynuna has a population of approximately 14 persons. Population numbers can increase during the months commencing April through until September.
- **Nelia** – Nelia has a population of approximately 2 persons. Populations can increase from the months of May through until September.

These townships are wide spread within the Shire and the locality plan provided in Figure 1.1 below shows the locations relative to each other:

Figure 1.1 – Locality Plan



According to the *2021 Queensland Regional Profiles for the McKinlay Local Government Area*, produced by the Queensland Government Statistician's Office, the average growth rate over the next five years is -1.2% and -2.4% over ten years.

A summary of the current and projected populations together with their water supply demands on these schemes is provided in Table 1.2 below:

Table 1.2 - Listing of Drinking Water Supplies

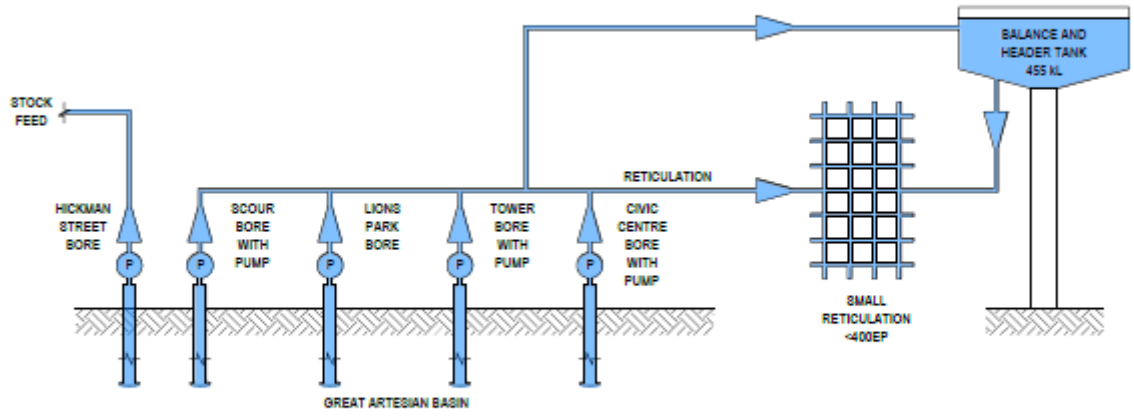
Scheme Name and Community Served	Operator	Current Figures				Projected in 10 years		
		Permanent Population served	Seasonal & Transit Population	Connections	Demand (kL/d)	Permanent Population Served	Connections	Demand (kL/d)
Julia Creek	MSC	*511	<5000	359	**1,685	511	359	***1,685
McKinlay	MSC	*12	<150	56	**105	12	56	***105
Kynuna	MSC	*14	<75	35	**186.9	14	31	***14
Nelia	MSC	*2	<20	8	**13.6	2	8	***15

** Permanent Population served is based on 2016 census data.*
*** Demand (kL/d) Current Figures include seasonal and transit population usages.*
**** Demand (kL/d) Projected in 10 years figures are not altered at this stage due to economic downturn. Figures will be updated in further reviews*

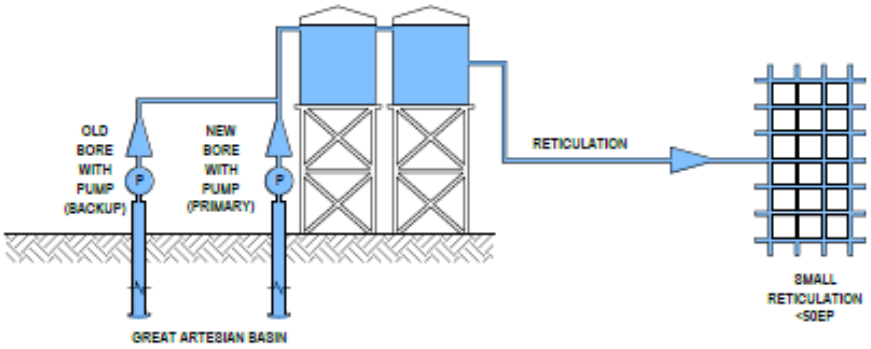
2 Details of Infrastructure for Providing the Service

2.1 Schematics

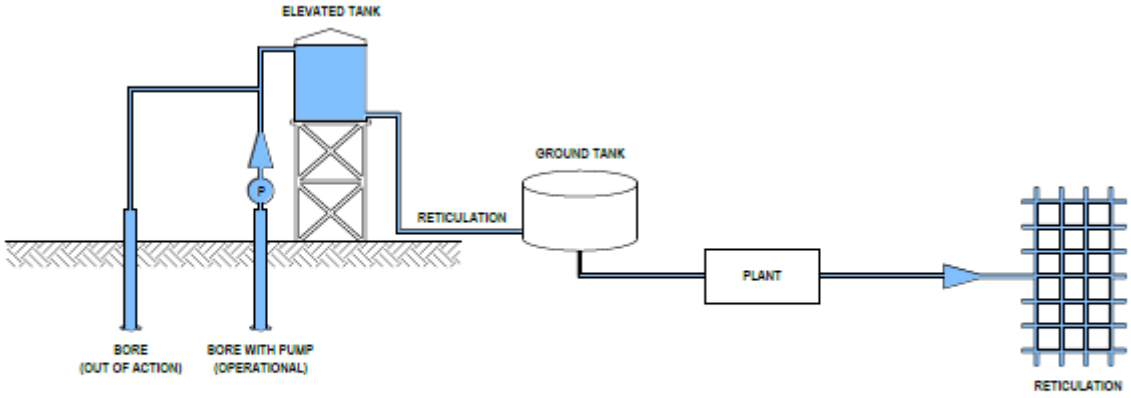
The schematics of the four (4) supply systems owned and operated by the McKinlay Shire Council as outlined in Section 1 above is displayed below.



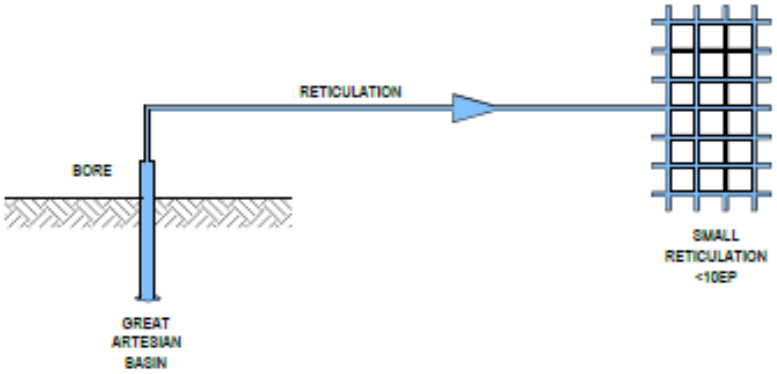
JULIA CREEK RETICULATION SCHEMATIC
NOT TO SCALE



McKINLAY RETICULATION SCHEMATIC
NOT TO SCALE



KYNUNA RETICULATION SCHEMATIC
NOT TO SCALE



NELIA RETICULATION SCHEMATIC
NOT TO SCALE

2.2 Source, Treatment and Distribution Details

The details of source, treatment and distribution of each of the schemes has been collated for the overview of the water supply systems in McKinlay Shire.

Table 2.1 below provides a summary of these details of infrastructure supporting the water supply schemes. Council's existing water licences in relation to all its potable water bores are provided in Appendix A of this plan.

Table 2.1 - Summary of Infrastructure Details

Key Infrastructure Component		Julia Creek Scheme	McKinlay Scheme	Kynuna Scheme	Nelia Scheme
Sources	Name	Julia Creek	McKinlay	Kynuna	Nelia
	Type	Bore water	Bore water	Bore water	Bore water
	Percent of Supply (%)	100	100	100	100
	Reliability	Good	Good	Good	Good
	Water Quality Issues	Naturally high fluoride	Naturally high sodium, naturally high pH	Naturally high iron, manganese and turbidity	Naturally high manganese
Sourcing Infrastructure	Type (Pumped, Gravity, Equipped bore, etc.)	Bore pumps assisted with gravity	Bore pumps assisted with gravity	Bore pumps assisted with gravity, positive pressure pumps to town	Bore free flowing
	Flow Rates	Civic Bore: 1100L/min Tower Bore:1100L/min Hickman Bore: 1050L/min Scour Bore: 350L/min Lions Park Bore: 1680L.min	Bore 1(Old Bore): 110L/min Bore 2 (New Bore): 120L/min	Bore 1 (New Bore): 110L/min	Free flowing
	Description	Great Artesian Basin (GAB)	GAB	GAB	GAB
Are there any sources that undergo treatment prior to supply?		No treatment – Water is sourced from deep artesian bores.	No treatment – Water is sourced from a deep artesian bore.	Iron/Manganese/ Turbidity reduction via automated sand filters with additional inline particle filters before town supply	No treatment – Water is sourced from a deep artesian bore.
Are there any sources that undergo disinfection prior to supply?		No disinfection**	No disinfection**	No disinfection**	No disinfection **
Distribution and Reticulation System	Pipe material	Asbestos cement and uPVC	Poly/uPVC	Poly/AC/uPVC	Poly
	Age range	20 years *reduction of whole of life due to higher water temperature values	20 years *reduction of whole of life due to higher water temperature values	20 years *reduction of whole of life due to higher water temperature values	20 years *reduction of whole of life due to higher water temperature values
	Approximate percent of total length	Unknown	Unknown	Unknown	Unknown
	Areas where potential long detention periods could be expected	N/A	N/A	N/A	N/A
	Areas where low water pressure (e.g., <12m) could	N/A	N/A	N/A	N/A

Key Infrastructure Component		Julia Creek Scheme	McKinlay Scheme	Kynuna Scheme	Nelia Scheme
	be expected during peak or other demand periods				
Storage Tanks/Balance Tanks	Ground-Level (No.)	N/A	N/A	1	N/A
	Elevated (No)	1	2	1	N/A
	Name	Water Tower (BT)	Tank 1 (ST) and Tank 2 (ST)	Tank 1 (ST) Tank 2 (ST)	N/A
	Capacity (ML)	0.455 ML	0.050ML (1) 0.050ML (2)	0.050 ML (1) 0.100 ML (2)	N/A
	Roofed (Y/N)	Y	Y	Y	N/A
	Vermin proof (Y/N)	Y	Y	Y	N/A
	Runoff directed off roof (Y/N)	Y	Y	Y	N/A
Water quality responsibility changes	Upstream location	N/A	N/A	N/A	N/A
	Downstream location	N/A	N/A	N/A	N/A

*** Note - The groundwater source is from deep aquifers which generally are free from pathogenic microorganisms and as the water is protected during transport in a sealed system from the source to the consumers, microbial quality should be assured. Refer to Section 4.2.2 Preventative Measure for Drinking Water Quality Australian Drinking Water Guidelines.*

2.2.1 Julia Creek Water Supply

a) Source

Potable water for the township of Julia Creek is sourced from four (4) Great Artesian Basin (GAB) bores. The bores include:

- Town No.1 bore (Civic Bore)
- Town No.2 bore (Tower Bore)
- Lions Park Bore; and
- Woolscour No. 4 bore (Scour Bore)

The Hickman Street Bore is used for stock and construction purposes only. A sign has been placed on the facility advising the community that the water is not fit for drinking.

All potable water supply bores are mechanically assisted to a pressure of 28 metres and injected directly into the Julia Creek Reticulation Network. A 455 kilolitres (kL) balance tank (named the Water Tower) is used as a pressure equaliser and storage reserve. The Water Tower was refurbished in September 2020 and consisted of the following repairs:

- Draining of reservoir and internal pre works inspections to confirm extent of concrete spalling and cracking for remediation
- Surface preparation of internal surface to remove deteriorated concrete
- Repair cracks and spalling to external walls
- Repair cracks and spalling to internal walls
- Wash/vacuum internal surfaces to remove dusts and foreign materials
- Apply primers and coatings to internal walls
- Removal of existing and install new roof ventilation hoods
- Installation of vermin proofing where necessary
- Design and install new access hatches
- Construct new roof electrical conduit with connection into switchboard
- Replacement of valves at ground level with new stainless-steel fixing and fittings and replacement of reflux valve with direct flange-flange spool piece

Details of each bore is shown below in Table 2.2 below:

Table 2.2 - Potable Water Network Bores - Julia Creek

Bore Information for Julia Creek Town No. 1 CIVIC	
Parameter	**Value**
Original Bore Number	Julia Creek Town No 1 DEP
Basin	9152
Original Description	Julia Creek Town
Date Drilled	01/01/1928
Casing Depth Bottom (m)	365.70m
Casing Material	Steel casing (unspecified)
Reg Number	374
Latitude	20-39-24
Longitude	141-44-45
Easting	577700
Northing	7715686
Diameter (mm)	203mm to 127mm
Bore Information for Julia Creek Town No 2 TOWER	
Parameter	**Value**
Original Bore Number	Julia Creek Town No 2 WTB
Basin	9152
Original Description	Julia Creek Town
Date Drilled	23/04/1964
Casing Depth Bottom (m)	370.60m
Casing Material	Steel casing (unspecified)
Reg Number	15748
Latitude	20-39-25
Longitude	141-44-27
Easting	577180
Northing	7715630
Diameter (mm)	203mm to 152mm
Bore Information for Julia Creek Town No 3 HICKMAN	
Parameter	**Value**
Original Bore Number	Julia Creek Town No 3 HSB
Basin	9152
Original Description	Julia Creek Town
Date Drilled	19/10/1984
Casing Depth Bottom (m)	367.00m
Casing Material	Steel casing (unspecified)
Reg Number	51948
Latitude	20-39-09
Longitude	141-44-30
Easting	577263
Northing	7716119
Diameter (mm)	219mm to 152mm
Bore Information for Julia Creek Woolscour –No 4 SCOUR	
Parameter	**Value**
Original Bore Number	Woolscour - SB
Basin	9152
Original Description	Julia Creek Town
Date Drilled	05/11/1923
Casing Depth Bottom (m)	344.10m
Casing Material	Steel casing (unspecified)
Reg Number	3112
Latitude	20-39-40
Longitude	141-43-13
Easting	575038
Northing	7715188
Diameter (mm)	203mm to 114mm
Bore Information for Lions Park Bore	
Parameter	**Value**
Original Bore Number	Lions Park Bore (New)
Basin	9152
Original Description	N/A
Date Drilled	18/08/2020

Casing Depth Bottom (m)	372.90m
Casing Material	Steel casing (unspecified)
Reg Number	184479
Latitude	20-39-25
Longitude	141-45-01
Easting	578145
Northing	7715641
Diameter (mm)	219mm to 203mm

The bore head and casing condition of all four (4) bores in Julia Creek are detailed below:

Civic Bore

The civic bore head is in good condition. This bore was refurbished in late 2021.

Tower Bore

The Tower bore head is in good condition with minor rusting observed on the outer base, treatment is to be undertaken on base and is outlined in the Risk Management Improvement Program in Section 6.1 of this plan. There is also a minor crack in the concrete around the base which also needs repairing. This bore was last logged in October 2018 and is scheduled to be logged again in October 2028.

Lions Park Bore

The lions bore head is in good condition. This bore was drilled in 2020.

Scour Bore

The scour bore head is in good condition. This bore was logged in November 2021. Minor cracks to the concrete around the base that requires removal and laying of new concrete to provide a stability platform around the pipe. This is outlined in the Risk Management Improvement Program in Section 6.1 of this plan.

Hickman Bore

The Hickman bore head is in good condition with minor rusting on the outer base, treatment is to be undertaken on base and is outlined in the Risk Management Improvement Program in Section 6.1 of this plan. This bore was last logged in November 2021 and is scheduled to be logged again in November 2031. This bore is used for stock and construction purposes only.

The following photos are images of the water bore sites in the Julia Creek:

Figure 1 – Photo of Civic Bore

Figure 2 – Photo of Water Tower Bore

Figure 2.3 – Photo of Hickman Street Bore

Figure 2.4 – Photo of Scour Bore

Figure 2.5 – Photo of Lions Park Bore

b) Treatment

Potable water supply is generally of high standard and meets drinking water guidelines directly from the bores with no further treatment required. Fluoride is naturally occurring within the water source and the four (4) water supply bores located in the town can have fluoride concentrations up to 3 milligrams per litre (mg/L). In discussions with Queensland Health a Fluoride Fact Sheet has been developed on behalf of Council containing relevant information for its potable water supplies. A copy of this fact sheet is provided in Appendix B of this management plan.

There is an open water quality incident report (*Incident No. DWI-3-84-00003*) with both the Regulator and Queensland Health. The fluoride quality is monitored and reported monthly to these authorities.

c) Distribution

The distribution pipework is generally made up of asbestos cement and uPVC materials.

The reticulation network is currently bulk metered as individual property meters are not currently installed due to high water temperatures that increase the level of meter failures.

As with most towns using water supplied from the GAB, hot water services have not been installed onto properties due to the high temperature of water available from the network. Increased flows on these properties can occur during times or periods of cooling within the reticulation network as the customers run taps to obtain higher temperature water from their supply.

Depending on the volumes of cooled water within the reticulation network, this process can take several minutes leading to larger than normal water consumption. Irrigation is a common practice within the town and the environmental conditions require additional water to counteract higher evaporation rates.

2.2.2 McKinlay Water Supply

a) Source

Potable water for the township of McKinlay is sourced from two (2) Great Artesian Basin (GAB) bores consisting of the primary bore, McKinlay Town Bore No 2 with backup or additional supply from the McKinlay Town Bore No.1.

Both potable water supply bores are mechanically assisted supplying two 50kL elevated storage tanks gravity feeding directing to the township. These storage units have been vermin proofed and Council staff undertake monthly visual inspections. The average water temperature within the network is approximately 50^{o}C.

Council have limited records detailing the inspection and cleaning regimes of these storage tanks however have commenced an investigation into the development of a regular inspection and cleaning program. This is outlined in Council Risk Management Improvement Program (RMIP) section 6.1 of this plan.

The condition of the tank platforms is in poor condition with rusting cracks and holes and no structural support around perimeter of platform. Council have commenced an investigation into the repair of these platforms which is outlined in the Risk Management Improvement Program (RMIP) section 6.1 of this plan.

Potable water sources for McKinlay have increased total dissolved solids and sodium levels above the aesthetic values of the ADWG and this is recorded as an increased level of electrical conductivity. Details of the bores are shown in Table 2.3 below:

Table 2.3 - Potable Water Network Bores – McKinlay

Bore Information for McKinlay Town Bore 1 (Additional/Backup)	
Parameter	**Value**
Original Bore Number	McKinlay Town Bore
Basin	9152
Original Description	Reserve 6
Date Drilled	01/01/1891
Casing Depth Bottom (m)	305.40m
Casing Material	Steel casing (unspecified)
Reg Number	385
Latitude	21-16-24
Longitude	141-17-56
Easting	530995
Northing	7647566
Diameter (mm)	254mm to 152mm
Bore Information for McKinlay Town Bore 2 (Main Bore)	
Parameter	**Value**
Original Bore Number	McKinlay Town Bore
Basin	9152
Original Description	
Date Drilled	26/05/2017
Casing Depth Bottom (m)	350.00m
Casing Material	Steel casing (unspecified)
Reg Number	163821
Latitude	21-16-24

Longitude	141-17-55
Easting	530978
Northing	7647570
Diameter (mm)	168mm to 141mm

The bore head condition of the two (2) bores are detailed below:

Bore 1 - Primary

This bore head is in a good condition. The crack in the concrete slab that is used as a stability platform around the bore was repaired in December 2022. This bore was drilled in May 2017 and is scheduled to be logged again in 2027.

Bore 2 – Back up

This bore head is in good condition. Repairs were made to the surface around the headworks in early 2022 to remove corrosion and rust, further repairs were undertaken under the steel plate in December 2022. This bore was logged in November 2021 and is scheduled to be logged again in November 2031.

The photo below provides an image of the McKinlay Water Facility bore:

Figure 2.5 – Photo of the McKinlay Water Facility

b) Treatment

There is no treatment system on the McKinlay water supply.

c) Distribution

Distribution pipework is generally made up of polyethene and uPVC materials.

2.2.3 Kynuna Water Supply

a) Source

Potable water for the township of Kynuna is currently sourced from one (1) Great Artesian Basin (GAB) bore, which is located at the water facility.

All water is currently supplied from the Kynuna Reserve One Bore as the original bore is no longer operational. Standing water in the bore is 20m below ground surface so the bore contains a fixed speed bore pump at approximately 40m depth that pumps to an elevated 50kL steel tank. The elevated tank then feeds a ground level 100kL steel plated tank. The water temperature from the bore is approximately 70°.

Similar to the McKinlay water scheme, Council have limited records detailing the inspection and cleaning regimes of these storage tanks however have commenced an investigation for the development of a regular inspection and cleaning program. This is outlined in Council Risk Management Improvement Program (RMIP) section 6.1 of this plan.

The hatch on the ground tank was repaired in December 2022.

Repairs have been undertaken on the gaps under the roof of ground water tank. This is to be regularly inspected and repaired as soon as practicable. The checklists will be modified to include these checks more precisely.

Council have been successful in obtaining funding for the installation of a new bore in Kynuna. Tenders were released to the market in September 2022. The tender request consisted of the following:

- Capping and sealing of existing bore
- Installation of new bore including headworks, concrete, power and pumps
- Modifications to treatment system
- Flow monitoring, controls and telemetry

Unfortunately, the funding does not cover the total costs of the above project. Council is currently liaising with the funding body regarding a change to the scope of this project to undertake the following works:

* Improvements to the existing filtration system which includes:
* Refit the 3 x Puretec IRS4000 filters and new filter media kit
* Installation of 3 x new Puretec SFS3000 polishing filters including solenoid kit for backwashing and arrange into three (3) parallel IRS4000/SRS3000 units
* Installation of new stainless-steel pipework
* Installation of new flow meters and pressure monitors
* Upgrade existing SCADA system which includes:
* Bore pump status and alarms
* Bore pump flows (instant and cumulative flow) and alarms
* Level status in elevated tank with alarms for low water and high water levels
* Level status in ground level tank with alarms for low water and high water levels
* Treatment pumps status and alarms
* Pressures downstream of pumps and downstream of filtration equipment
* Reticulation system flow (instant and cumulative flow)
* Installation of steel walkway on elevated storage tank

Details of the bore is shown in Table 2.4 below:

Table 2.4 - Potable Water Network Bores - Kynuna

Bore Information for Kynuna Reserve One Bore	
Parameter	**Value**
Original Bore Number	n/a
Basin	0021
Original Description	Reserve One, Kynuna
Date Drilled	05/12/1995
Casing Depth Bottom (m)	670.50m
Casing Material	Steel casing (unspecified) Plastic casing (unspecified)
Reg Number	93061
Latitude	21-34-30
Longitude	141-54-52
Easting	594674
Northing	7613943
Diameter (mm)	219mm to 168mm

The bore head and casing condition of the bore is detailed below:

The bore head is in fair condition. The base was treated and sealed in December 2022. This bore was logged in October 2018 and is scheduled to be logged again in 2028.

The photo provided below is an image of the Kynuna Water Facility:

Figure 2.6 - Photo of Kynuna Bore and Elevated Storage Tank

b) Treatment

Council has installed a multistage filtration system to minimise the level of iron and manganese in the town's water supply. Iron and Manganese is primarily removed using three (3) Puretec IRS4000 media filters that are arranged parallel after the pumps. Downstream of the multimedia filters are two (2) 400-micron disk filters and three (3) 100 micron cartridge filters. As outlined above, Council is currently looking into additional treatment options.

Similar to the other schemes there is no disinfection.

c) Distribution

The distribution pipework is generally made up of asbestos cement polyethene and uPVC materials.

2.2.4 Nelia Water Supply

a) Source

Potable water for the township of Nelia is sourced from a single free flowing Great Artesian Basin (GAB) bore. The bore is securely fenced off to prevent unauthorised access. Details of the bore is shown in Table 2.5 below:

Table 2.5 - Potable Water Network Bores – Nelia

Bore Information for Nelia Town Bore	
Parameter	**Value**
Original Bore Number	Nelia Town
Basin	9150
Original Description	Reserve 21
Date Drilled	09/01/1928
Casing Depth Bottom (m)	396.00
Casing Material	Steel casing(unspecified)
Reg Number	389
Latitude	20-39-18
Longitude	142-12-59
Easting	626711
Northing	7715569
Diameter (mm)	203mm to 127mm

The photo provided below provides an image of the Nelia Water Facility:

Figure 2.7 - Photo of Nelia Water Facility

b) Treatment

Similar to each of the other schemes, Nelia also has no treatment process.

c) Distribution

The distribution pipework is generally made up of polyethene and uPVC materials.

2.3 Key stakeholders

McKinlay Shire Council maintains a register of stakeholders associated with Council's water supply sources and operational works.

The register as shown in Table 2.6 below details the entity type, purpose for engagement, roles of parties and nominated personnel (specific details based on roles where required).

The stakeholders involved in managing incidents (including water quality) are engaged through a structured process and in line with Council's policies and procedures.

2.4 Stakeholder Manager

Council's operating protocols include day-to-day internal and external community stakeholder engagement with information released via Council's social and electronic media network together with onsite direct community engagement.

Council also facilitates the indirect regulatory/government stakeholder engagements through its regulatory quality reporting and inspections. An overview of the Water Supply Key Stakeholders is provided in Table 2.6 below:

Table 2.6 - Water Supply Key Stakeholders

Organisation	Details	Relevance	Role
McKinlay Shire Council	Mayor and Councillors	Key Stakeholder	Responsible for policy oversight and has a duty of care to provide a safe and reliable potable water supply to its communities.
McKinlay Shire Council	Chief Executive Officer	Key Stakeholder	Responsible for operational oversight
McKinlay Shire Council	Director of Engineering and Environmental Regulatory Services	Key Stakeholder	Responsible for the day-to-day operations of the networks.

McKinlay Shire Council	Engineering & Regulatory Services Staff (Delegated Officers)	Key Stakeholder	Responsible for the maintenance activities and the collecting of samples within the networks.
McKinlay Shire Council	Communities	Key Stakeholder	Public health Responsible for maintaining the integrity of the network within their property.
Department of Regional Development, Manufacturing and Water (DRDMW)	Regulator	Regulatory oversight	Public health, environmental and regulatory approver of DWQMP
Department of Resources (DoR)	Regulator	Regulatory oversight	Regulatory oversight
Queensland Health	Regulator	Regulatory oversight	Public health (Provide final approved copy of DWQMP upon request)
Townsville Water Laboratory	labenquiries@townsville.qld.gov.au	Stakeholder	External laboratory performing water analysis and reporting.
Contractors		Stakeholder	Public health Responsible for maintaining the integrity of the network within their works.
Other users		Customer	Duty of care; not to undertake activities that propose a risk to the network.

3 Identify Hazards and Hazardous Events

McKinlay Shire Council is committed to ensuring that the water quality from its sources to its customers is fit and safe for its intended use.

Council manages the hazards and risks associated with its operational works in all the areas of water supply that have the potential to threaten Council's ability to maintain a safe water supply.

To mitigate risks with water quality, the following issues need to be considered:

- Water quality investigations and storage management
- Land use management
- Town planning and regulation
- Community information and rural extension
- Compliance responsibilities and regulation
- Environmental management systems

Water quality risks have been identified in relation to Councils' sources and water treatment processes. Considerations included:

- What can happen, where and when?
- Why and how it can happen?
- Tools and techniques used include checklists, judgments based on experience, records, flow charts and interviews with relevant site personnel, etc.

Various components of risks include:

- **Source** of risk or hazard e.g. raw water contamination
- **Event** e.g. supply issue
- **Consequence** e.g. drinking water contamination resulting in illness
- **Controls** e.g. early warning systems, clean-up systems, policies, training
- **When and Where** e.g. could the risk occur?

The approach used for identification of risks will consist of:

- Structured interviews with key personnel authorised and responsible for the operations and maintenance and forward planning of Council's potable water supply network
- Review of relevant historical records and procedures
- Site inspections
- Review of policy and procedures

3.1 Information Gathering – Water Quality and Source Characteristics

3.1.1 Water Quality Information

McKinlay Shire Council undertakes monthly water quality testing across its entire networks plus additional testing where deemed necessary. These tests are processed by a National Association of Testing Authorities (NATA) approved laboratory and the results are forwarded to relevant authorities and stored within Council's record management system.

The water samples are collected by the Water and Sewerage Officer or another appropriately trained staff member within the Engineering and Regulatory Services Department, where they are transported overnight via road freight to the Townsville Water Laboratory for testing.

There have been no significant changes to the catchment characteristics as the water source as deep bores tapping the GAB.

A summary of the Water Quality Monitoring Data (July 2017 – March 2022) is provided in the tables below.

Julia Creek

Council undertakes testing in accordance with the ADWG. A standing water quality incident report in relation to non-compliant fluoride concentrations more than 1.5mg/L is permanently open for Julia Creek's potable water network with the Regulator. All other parameters are generally within the NHRC limits.

Opportunistic Pathogens

Council commenced Legionella pneumophila testing in all water supply schemes in June 2020. There is currently an open incident *(DWI-84-20-08454)* with the Regulator. Council obtained advice from the Townsville Public Health Unit regarding the detection of legionella. The advice received was that these levels are expected from an undisinfected drinking water supply. They suggested providing health related advice to the community on ways to avoid inhalation of aerosols or if Council wants a holistic solution, they should consider chlorinating their water supply, after appropriately consulting with their residents. This is currently still being investigated and is outlined in the Risk Assessment section of this plan.

Testing for Naegleria will be undertaken in early 2023. This is further outlined in the Risk Assessment section of this plan.

A summary of Legionella pneumophila sampling data is in table 3.1 below:

Table 3.1 – Legionella pneumophila sampling data - Julia Creek

Date	**Location** **Amberly Drive**	**Location** **Netterfield Street**
09 June 2020	<10	**200**
11 May 2021	**10**	**100**

Table 3.2 - Julia Creek Water Quality Sampling Data (Physical and Chemical)

Parameter	**Sampling Locations**	**Time Period**	**No. of Samples taken**	**Summary of Results**			**ADWG Guideline Value**	**No. samples exceed limits**	**Comments**
				Maximum value	**Average value**	**Minimum value**			
pH	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	8.19 8.26	7.42 7.78	6.99 6.97	6.5 – 8.5 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Sodium (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	145 143	110.91 115.36	76.6 72.9	180 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Aluminium (mg/L)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	0.154 0.076	0.008 0.002	0.0 0.0	0.2 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced

									the Amberly Dr sample site
Boron (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	0.219 0.113	0.083 0.079	0.034 0.0	4 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Iron (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	5.8 0.29	0.32 0.09	0.0 0.0	0.3 (Aesthetic Limit)	**6** 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site *Iron levels exceeded the aesthetic guideline limit in Jul 17, Nov 17, Mar 18, Apr 18, Mar 19, and Jan 2022 in the Amberly Drive Sample
Manganese (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	0.23 0.06	0.034 0.032	0.005 0.003	0.5 (Health Limit) 0.1 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Copper (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	0.285 0.160	0.016 0.024	0.0 0.0	2 (Health Limit) 1 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Zinc (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	0.177 0.025	0.010 0.004	0.0 0.0	3 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Ammonia (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	0.35 0.35	0.19 0.26	0.0 0.0	0.5 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Oxidised Nitrogen as NPxN (mg/l as N)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	0.47 0.52	0.08 0.05	0.0 0.0	11.3 (as Nitrate) (Health Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Nitrate as N (mg/L as N)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	21 20	0.0 0.0	0.0 0.0	0.0 0.0	0.91 (Health Limit)	0 0	*Commenced Nitrate testing in June 2018. Nil detected in all samples

Silica (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	46.8 50.7	33.48 34.54	17.6 25.4	80 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Chloride (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	49.4 49.2	42.74 44.80	42.6 32.3	250 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Sulphate $SO4^-$	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	9.9 11.3	6.01 6.40	3.8 3.7	250 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
Fluoride (mg/l)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	3.42 3.43	2.87 3.01	2.81 2.24	1.5 (Health Limit)	**54** **53**	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site *Fluoride sample results are reported to Regulator monthly as required under Incident # DWI-3-84-00003
Turbidity (NTU)	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	30.5 2.4	2.21 0.52	0.2 0.1	5 (Aesthetic Limit)	**4** 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site *Turbidity levels exceeded the aesthetic guideline limit in Jul 17, Nov 17, Mar 18, and Apr 18 in the Amberly Drive Sample
True Colour	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	7 9	1.24 1.31	0 0	15 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced the Amberly Dr sample site
E. coli							<1 (Health Limit)		*Testing did not occur in February 2019, June 2019, and April 2021 *Alternative testing points in March 2021, December 2021 and February 2022 replaced

	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	20 <1	0.39 0	<1 <2		**2** 0	the Amberly Dr sample site *E. coli detected in Amberly Drive sample in February 2018. Incident # DWI-7-84-00016 *E. coli detected in Amberly Drive sample in March 2020. No incident number was advised
Heterotrophic Plate Count 36C	Amberly Drive Coyne Street	July 2019 – March 2022 July 2019 – March 2022	32 32	>300 >300	19.31 22.94	<1 <1	No guideline value	NA NA	*Commenced HPC testing in July 2019 to provide an indicator of distribution system cleanliness
Thermotolerant Coliforms	Amberly Drive Coyne Street	July 2017 – March 2022 July 2017 – March 2022	54 53	20 1	0.46 0.04	<1 <1	Should not be detected in any 100ml sample of drinking water. If detected in drinking water, immediate action should be taken including investigation of potential sources of faecal contamination.	**5** **2**	*TC were detected in Amberly Drive samples in Feb 18, Mar 18, Apr 18, Mar 20, and Feb 21 *TC were detected in Coyne Street samples in Feb 18 and Apr 18 *All TC detections were low. Investigations into these detections found that cross contamination was the likely cause
Cadmium	Lions Park Coyne Street	November 2022 November 2022	1 1	<0.0004 <0.0004	<0.0004 <0.0004	<0.0004 <0.0004	0.002mg/L (Health)	0 0	Council commenced testing in November 2022 and will undertake this test annually
Lead	Lions Park Coyne Street	November 2022 November 2022	1 1	<0.0006 <0.0006	<0.0006 <0.0006	<0.0006 <0.0006	0.01mg/L (Health)	0 0	Council commenced testing in November 2022 and will undertake this test annually

Incidents – Julia Creek

All non-compliances with water quality criteria in drinking water are to be reported to the Regulator as soon as practicable after becoming aware of the non-compliance as per section 102 of the *Water Supply (Safety and Reliability) Act 2008*. A summary of incidents reported in Julia Creek for the period of 2018-2022 is outlined in table 3.3 below:

Table 3.3 – Reportable Incidents – Julia Creek

Incident Number	Incident Date	Scheme / Location	Parameter / Issue	Preventive Actions
DWI-7-84-00016	13/02/2018	Julia Creek 4 Amberly Drive	E.coli	* Staff flushed end of line near sample point * Follow up sampling to ensure three (3) clear samples were taken * Investigations into this incident found that the detection may have been due to incorrect handling of initial sample **NOTE: This incident was closed on 9 January 2018**
Unknown	11/03/2020	Julia Creek 4 Amberly Drive	E.coli	* Boil water alert issued to community * Staff flushed lines near sample point * Follow up sampling to ensure two (2) clear samples were taken * Investigations into this incident found that the detection may have been due to cross contamination from initial sample taken **NOTE: This incident was closed on 24 March 2020**
DWI-84-22-09766	29/08/2022	Julia Creek	Non-compliance with E.coli annual 98% rolling value	* On reviewing the Annual Report for the 2020-21 financial year, the regulator determined that Council dropped below 98% of the annual E.coli compliance value due to detection of E.coli in March 2020. Council were issued a Information Requirement Notice on the 29 August 2022. * Initial notification and investigation reports were submitted to the Department on the 6 September 2022. **NOTE: Staff were unaware of the requirements to report this as an incident. Internal processes have improved to prevent this from happening in future. Council is also investigating into commencing additional sampling (Colilert) to prevent the rolling valve dropping below 98%.**

McKinlay

Council fulfils its requirements for water quality testing under the ADWG. Council has in the past activated a standing incident report relating to fluoride levels contained within its potable supply. Council continues to closely monitor the fluoride levels and will trigger an incident or notification report if the levels exceed that of 1.5mg/L in future.

In addition to fluoride issues, the water source experiences periods of slightly high pH levels and sodium concentrations. Council has an open notification policy for its residents. All other parameters are generally within NHRC limits.

Opportunistic Pathogens

A summary of Legionella pneumophila sampling data for McKinlay is in table 3.4 below:

Table 3.4 – Legionella pneumophila sampling data - McKinlay

Date	**Location** **Bore**	**Location** **Reticulation**
09 June 2020	**100**	**300**
11 May 2021	<10	**2,300**

Table 3.5 - McKinlay Water Quality Sampling Data (Physical and Chemical)

Parameter	**Sampling Locations**	**Time Period**	**No. of Samples taken**	**Summary of Results**			**ADWG Guideline Value**	**No. samples exceed limits**	**Comments**
				Maximum value	**Average value**	**Minimum value**			
pH	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	8.97 8.64	8.52 8.33	8.24 7.97	6.5 – 8.5 (Aesthetic Limit)	**35** **5**	*Testing did not occur in February 2019, June 2019, and April 2021 *pH levels were just over the aesthetic guideline limit of 8.5 in the bore samples ranging from Aug 17 through to Dec 20 * pH levels exceeded the aesthetic guideline limit in May 18, Aug 18, Sept 18, Oct 18, and Jun 20 in the reticulation samples
Sodium (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	245 248	206.63 204	137 140	180 (Aesthetic Limit)	**49** **40**	*Testing did not occur in February 2019, June 2019, and April 2021 *Sodium levels consistently exceeded the aesthetic guideline limit in both sample locations.
Aluminium (mg/L)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.141 0.312	0.015 0.022	0.0 0.0	0.2 (Aesthetic Limit)	0 **2**	*Testing did not occur in February 2019, June 2019, and April 2021 *Aluminium levels exceeded the aesthetic

									guideline limit in the reticulation samples in Feb & Mar 2021
Boron (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.353 0.301	0.222 0.226	0.057 0.008	4 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Iron (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.19 0.53	0.07 0.067	0.02 0.003	0.3 (Aesthetic Limit)	0 **2**	*Testing did not occur in February 2019, June 2019, and April 2021 *Iron levels exceeded the aesthetic guideline limit in the reticulation samples in Feb & Mar 2021
Manganese (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.06 0.05	0.009 0.049	0.0 0.0	0.5 (Health Limit) 0.1 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Copper (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.128 0.262	0.008 0.026	0.0 0.0	2 (Health Limit) 1 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Zinc (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.143 0.380	0.011 0.024	0.0 0.0	3 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Ammonia (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.7 0.61	0.36 0.04	0.0 0.0	0.5 (Aesthetic Limit)	**12** **1**	*Testing did not occur in February 2019, June 2019, and April 2021 *Ammonia levels exceeded the aesthetic guideline limit in the bore samples in Aug 17, Apr – May 18, May 19, Mar 21, Jun – Nov 21, Mar 22 *Ammonia levels exceeded the aesthetic guideline limit in the reticulation samples in Mar 21
Oxidised Nitrogen as NPxN (mg/l as N)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	0.88 1.0	0.28 0.72	0.01 0.02	11.3 (as Nitrate) (Health Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Nitrate as N (mg/L as N)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	21 20	0.0 0.0	0.0 0.0	0.0 0.0	0.91 (Health Limit)	0 0	*Commenced Nitrate testing in June 2018. Nil detected in all samples

Silica (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	37.8 24.2	21.66 21.08	16.2 18	80 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Chloride (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	65.8 63.8	60.24 60.22	56.3 56.0	250 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Sulphate $SO4^-$	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	12.5 9.7	2.56 2.73	0.0 0.0	250 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Fluoride (mg/l)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	1.55 1.59	1.36 1.35	1.09 1.09	1.5 (Health Limit)	**3** **4**	*Testing did not occur in February 2019, June 2019, and April 2021 *McKinlay did have a standing incident report with the Regulator. This has now been closed but will continue to review and re-open incident should results exceed 1.5mg/L
Turbidity (NTU)	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	2.7 10.6	1.04 1.16	0.2 0.2	5 (Aesthetic Limit)	0 **2**	*Testing did not occur in February 2019, June 2019, and April 2021 *Turbidity levels exceeded the aesthetic guideline limit in the reticulation samples in Feb and Mar 2021
True Colour	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	9 9	1.80 1.39	0.0 0.0	15 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
E. coli	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	8 2	0.17 0.06	<2 <2	<1 (Health Limit)	**5** **2**	*Testing did not occur in February 2019, June 2019, and April 2021 *E. coli detected in Bore Sample in Jul 17. Incident #: DWI-7-84-00013 *E. coli detected in Bore Sample in Nov 17. Incident #: DWI-7-84-00014 *E. coli detected in Bore and Reticulation Sample in Mar 18. Incident #: DWI-7-84-00017

									*E. coli detected in Bore and Reticulation Sample in Sept 20. Incident #: DWI-84-20-08521 *E. coli detected in Bore Sample in Feb 22. Incident #: DWI-84-22-09453
Heterotrophic Plate Count 36C	Bore Reticulation	July 2019 – March 2022 July 2019 – March 2022	32 32	>300 >300	32.44 79.19	<1 <1	No guideline value	NA NA	*Commenced HPC testing in July 2019 to provide an indicator of distribution system cleanliness
Thermotolerant Coliforms	Bore Reticulation	July 2017 – March 2022 January 2018 – March 2022	54 48	201 220	4.76 5.06	<2 <2	Should not be detected in any 100ml sample of drinking water. If detected in drinking water, immediate action should be taken including investigation of potential sources of faecal contamination.	**10** **10**	*TC were detected in the Bore samples in Nov-Jan 18, Mar 18, Jul 18, Mar 20, Sep 20, Feb 21 and Jan – Feb 22. *TC were detected in the Reticulation samples in Jan 18, Apr 18, Jun 18, Jul 18, Mar 20, Sep 20, Feb 21 and Jan 22 *Majority of the TC detections were low. Investigations into these detections found that cross contamination was the likely cause
Cadmium	Bore Reticulation	November 2022 November 2022	1 1	<0.0004 <0.0004	<0.0004 <0.0004	<0.0004 <0.0004	0.002mg/L (Health)	0 0	Council commenced testing in November 2022 and will undertake this test annually
Lead	Bore Reticulation	November 2022 November 2022	1 1	<0.0006 0.0007	<0.0006 0.0007	<0.0006 0.0007	0.01mg/L (Health)	0 0	Council commenced testing in November 2022 and will undertake this test annually

Incidents – McKinlay

All non-compliances with water quality criteria in drinking water are to be reported to the Regulator as soon as practicable after becoming aware of the non-compliance as per section 102 of the *Water Supply (Safety and Reliability) Act 2008*. A summary of incidents reported in McKinlay for the period of 2017-2022 is outlined in table 3.6 below:

Table 3.6 – Reportable Incidents – McKinlay

Incident Number	Incident Date	Scheme / Location	Parameter / Issue	Preventive Actions/Comments
DWI-7-84-00013	25/07/2017	McKinlay Town Bore, Landsborough Highway	E.coli	* Boil Water Alert issued to the community * Follow up sampling to ensure three (3) clear samples were taken * Daily flushing (approx. 4 hours) occurred due to low turnover of water * Storage Tanks chlorinated **NOTE: This incident was closed on 21 August 2017**
DWI-7-84-00014	20/11/2017	McKinlay Town Bore, Landsborough Highway	E.coli	* Boil Water Alert issued to the community * Follow up sampling to ensure three (3) clear samples were taken * Daily flushing (approx. 4 hours) occurred due to low turnover of water * Storage Tanks chlorinated **NOTE: This incident was closed on 9 January 2018**
DWI-7-84-00015	24/01/2018	McKinlay Town Bore and Roadhouse, Landsborough Highway	Fluoride	* The township has readings around 1.45mg/L every month however some months see the level exceed the health guideline limit of 1.5mg/L * Open incident with the Regulator, results reported monthly **NOTE: This incident was closed on 30 April 2020**
DWI-7-84-00017	14/03/2018	McKinlay Town Bore and Roadhouse, Landsborough Highway	E.coli	* Boil Water Alert issued to the community * Follow up sampling to ensure three (3) clear samples were taken * Daily flushing (approx. 4 hours) occurred due to low turnover of water * Storage Tanks chlorinated * Bird proofing was undertaken on storage tank to ensure that there is no bird intrusion * **NOTE: This incident was closed on 6 April 2018**
DWI-84-20-08521	10/09/2020	McKinlay Town Bore and Roadhouse, Landsborough Highway	E.coli	* Boil Water Alert issued to the community * Follow up sampling to ensure three (3) clear samples were taken * Daily flushing (approx. 4 hours) occurred due to low turnover of water * Storage Tanks chlorinated * Inspections on storage tank and piping to ensure it was vermin proof * Council suspected cross contamination in initial sample due to very high winds with dusty conditions on the day of sampling * Council to investigate into scouring program due to high HPC levels observed * **NOTE: This incident was closed on 29 September 2020**

DWI-84-22-09453	01/02/2022	McKinlay Town Bore, Landsborough Highway	E.coli	* Boil Water Alert issued to the community as a precaution only due to detection being in bore sample only * Follow up sampling undertaken as required * Regular flushing of lines * Inspections of Storage Tank and piping to ensure it is vermin proof * New tap installed directly off bore for future sampling * Investigations into source of contamination found the initial sample was taken from a tap installed on a stock line that has very limited use * **NOTE: This incident was closed on 9 June 2022**
DWI-84-22-09767	29/08/2022	McKinlay	Non-compliance with E.coli annual 98% rolling value	* On reviewing the Annual Report for the 2020-21 financial year, the regulator determined that Council dropped below 98% of the annual E.coli compliance value due to detection of E.coli in September 2020. Council was issued a Information Requirement Notice on the 29 August 2022 * Initial notification and investigation reports were submitted to the Department on the 6 September 2022 * **NOTE: Staff were unaware of the requirements to report this as an incident. Internal processes have improved to prevent this from happening in future. Council is also investigating into commencing additional sampling (Colilert) to prevent the rolling valve dropping below 98%.**
DWI-84-22-09820	07/10/2022	McKinlay	Non-compliance with E.coli annual 98% rolling value	* As E.coli was detected in the McKinlay Bore sample in February 2022, this brought the annual compliance value under 98% * Council has commenced weekly (where possible) sampling until 100% is reached * Council is re-implementing Colilert sampling in addition to the laboratory sampling. This is expected to commence early 2023 **NOTE: This incident is still open as at December 2022**

Kynuna

Council undertakes testing in accordance with the ADWG. Council also has a pre-treatment system installed prior to its reticulation network for the purpose of removal of iron and manganese that is suspended in the source water from the groundwater bore. Although the post treatment levels of both these suspended products is significantly lower than the source water, the limits are still over the maximum guideline limits.

Council engaged a contractor in March 2022 to install new media in the three (3) existing Puretec IRS4000 filters. These filters are expected to last approximately 2-3 years however the riser pipe screen should be replaced every 12 months.

Council is currently investigating into additional treatment options for this scheme that consists of installation of additional Puretec filters, timed automated backwash system, decommissioning of disk filters, installation of new stainless steel pipe work, flow meters and new pressure meters that will hopefully assist in the reduction of the iron and manganese levels below the guideline limits. This is outlined in the Risk Management Improvement Program (RMIP) section of this plan.

Opportunistic Pathogens

A summary of Legionella pneumophila sampling data for Kynuna is in table 3.7 below:

Table 3.7 – Legionella pneumophila sampling data - Kynuna

Date	Location Residence	Location Bore
09 June 2020	<10	<10
11 May 2021	**10**	<10

Table 3.8 - Kynuna Water Quality Sampling Data (Physical and Chemical)

Parameter	Sampling Locations	Time Period	No. of Samples taken	Summary of Results			ADWG Guideline Value	No. samples exceed limits	Comments
				Maximum value	Average value	Minimum value			
pH	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	8.13 8.00	7.71 7.66	6.88 6.98	6.5 – 8.5 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Sodium (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	145 155	94.33 95.50	61 61.5	180 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Aluminium (mg/L)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.084 0.063	0.004 0.007	0.0 0.0	0.2 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021

Boron (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.126 1.08	0.062 0.079	0.018 0.016	4 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Iron (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	13.1 302	0.81 18.45	0.07 0.35	0.3 (Aesthetic Limit)	**38** **54**	*Testing did not occur in February 2019, June 2019, and April 2021 *Iron levels were consistently more than the aesthetic guideline limit. Council has installed a multi-stage filtration system to minimise these levels from the raw/source water to consumer. Levels are significantly reduced.
Manganese (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.34 9.7	0.03 0.08	0.001 0.07	0.5 (Health Limit) 0.1 (Aesthetic Limit)	**2 (A)** **52 (A)** **10 (H)**	*Testing did not occur in February 2019, June 2019, and April 2021 *Health exceedances were in raw/source water samples only.
Copper (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.35 1.49	0.01 0.09	0 0.003	2 (Health Limit) 1 (Aesthetic Limit)	0 **2**	*Testing did not occur in February 2019, June 2019, and April 2021 *Exceedances were in raw/source water samples only in Feb 20 and Nov 21
Zinc (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.557 9.02	0.020 0.486	0.0 0.003	3 (Aesthetic Limit)	0 **2**	*Testing did not occur in February 2019, June 2019, and April 2021 *Exceedances were in raw/source water samples only in Jan 20 and Feb 20
Ammonia (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.21 0.33	0.010 0.171	0.0 0.0	0.5 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Oxidised Nitrogen as NPxN (mg/l as N)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.44 0.34	0.30 0.12	0.0 0.0	11.3 (as Nitrate) (Health Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Nitrate as N (mg/L as N)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	21 20	0.0 0.0	0.0 0.0	0.0 0.0	0.91 (Health Limit)	0 0	*Commenced Nitrate testing in June 2018. Nil detected in all samples
Silica (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	50.2 58.9	34.83 36.32	25.4 24.1	80 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Chloride (mg/l)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	150 167	54.18 55.05	38.6 48	250 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Sulphate $SO4^-$	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	11 8.1	2.73 2.69	0.0 0.0	250 (Aesthetic Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Fluoride (mg/l)							1.5		

	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	0.35 0.33	0.29 0.29	0.14 0.19	(Health Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Turbidity (NTU)	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	94.4 866	9.32 98.29	1.3 0.5	5 (Aesthetic Limit)	**39** **50**	*Testing did not occur in February 2019, June 2019, and April 2021 *Turbidity levels were consistently more than the aesthetic guideline limit. Council has installed a multi-stage filtration system to minimise these levels from the raw/source water to consumer *Media in the three (3) Puretec IRS4000 filters were replaced in March 2022.
True Colour	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	15 56	4.02 10.48	0.0 1	15 (Aesthetic Limit)	0 **10**	*Testing did not occur in February 2019, June 2019, and April 2021 *True colour levels exceeded the aesthetic guideline limit in Jan 20, Feb 20, Mar 20, Aug 20, Dec 20, Jan 21, Jun 21, Jul 21, Aug 21, Jan 22 in the Bore Sample.
E. coli	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	<1 <1	<1 <1	<2 <2	<1 (Health Limit)	0 0	*Testing did not occur in February 2019, June 2019, and April 2021
Heterotrophic Plate Count 36C	Reticulation Bore	July 2019 – March 2022 July 2019 – March 2022	32 32	>300 >300	31.28 18.375	<1 <1	No guideline value	NA NA	*Commenced HPC testing in July 2019 to provide an indicator of distribution system cleanliness
Thermotolerant Coliforms	Reticulation Bore	July 2017 – March 2022 July 2017 – March 2022	54 54	26 56	0.52 1.07	<1 <1	Should not be detected in any 100ml sample of drinking water. If detected in drinking water, immediate action should be taken including investigation of potential sources of faecal contamination.	**2** **2**	*TC were detected in the Reticulation samples in Jul 18 and Feb 22 *TC were detected in the Bore samples in Feb 20 and Jan 21 *All TC detections were low. Investigations into these detections found that cross contamination was the likely cause
Cadmium	Reticulation Bore	November 2022 November 2022	1 1	<0.0004 <0.0004	<0.0004 <0.0004	<0.0004 <0.0004	0.002mg/L (Health)	0 0	Council commenced testing in November 2022 and will undertake this test annually
Lead	Reticulation Bore	November 2022 November 2022	1 1	0.0007 <0.0006	0.0007 <0.0006	0.0007 <0.0006	0.01mg/L (Health)	0 0	Council commenced testing in November 2022 and will undertake this test annually

Nelia

Council undertakes testing in accordance with the ADWG. Council notes that the town supply groundwater bore can at times under load contain suspended manganese of a level that is a concern aesthetically. Council has an open notification policy for its residents and the levels are monitored. Main parameters are generally within limits.

Opportunistic Pathogens

A summary of Legionella pneumophila sampling data for Nelia is in table 3.9 below:

Table 3.9 – Legionella pneumophila sampling data - Nelia

Date	Location - Nelia
09 June 2020	<10
11 May 2021	**10**

Table 3.10 - Nelia Water Quality Sampling Data (Physical and Chemical)

Parameter	Sampling Locations	Time Period	No. of Samples taken	Summary of Results			ADWG Guideline Value	No. samples exceed limits	Comments
				Maximum value	Average value	Minimum value			
pH	Railway Street, Nelia	July 2017 – March 2022	54	7.98	7.54	6.79	6.5 – 8.5 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Sodium (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	79.8	66.4	43.4	180 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Aluminium (mg/L)	Railway Street, Nelia	July 2017 – March 2022	54	0.041	0.002	0.0	0.2 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Boron (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	0.056	0.041	0.0	4 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Iron (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	0.14	0.07	0.02	0.3 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021

Manganese (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	0.14	0.11	0.05	0.5 (Health Limit) 0.1 (Aesthetic Limit)	**46 Aesthetic Limit**	*Testing did not occur in February 2019, June 2019, and April 2021 *Manganese levels were consistently more than the aesthetic guideline limit.
Copper (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	0.034	0.005	0.0	2 (Health Limit) 1 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Zinc (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	0.202	0.020	0.0	3 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Ammonia (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	0.40	0.20	0.11	0.5 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Oxidised Nitrogen as NPxN (mg/l as N)	Railway Street, Nelia	July 2017 – March 2022	54	0.06	0.005	0.0	11.3 (as Nitrate) (Health Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Nitrate as N (mg/L as N)	Railway Street, Nelia	July 2017 – March 2022	21	0.0	0.0	0.0	0.91 (Health Limit)	0	*Commenced Nitrate testing in June 2018. Nil detected in all samples
Silica (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	30.6	23.36	19.2	80 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Chloride (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	42.3	38.79	35.9	250 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Sulphate $SO4^-$	Railway Street, Nelia	July 2017 – March 2022	54	107	13.05	8.2	250 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Fluoride (mg/l)	Railway Street, Nelia	July 2017 – March 2022	54	0.19	0.15	0.022	1.5 (Health Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Turbidity (NTU)							5 (Aesthetic		*Testing did not occur in February 2019, June

	Railway Street, Nelia	July 2017 – March 2022	54	3	0.75	0.20	Limit)	0	2019, and April 2021
True Colour	Railway Street, Nelia	July 2017 – March 2022	54	8	1.2	0	15 (Aesthetic Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
E. coli	Railway Street, Nelia	July 2017 – March 2022	54	<1	<1	<1	<1 (Health Limit)	0	*Testing did not occur in February 2019, June 2019, and April 2021
Heterotrophic Plate Count 36C	Railway Street, Nelia	July 2019 – March 2020	32	>300	41.63	<1	No guideline value	NA	*Commenced HPC testing in July 2019 to provide an indicator of distribution system cleanliness
Thermotolerant Coliforms	Railway Street, Nelia	July 2017 – March 2022	54	17	0.31	<1	Should not be detected in any 100ml sample of drinking water. If detected in drinking water, immediate action should be taken including investigation of potential sources of faecal contamination.	**1**	*TC were detected in Jul 18.
Cadmium	Railway Street, Nelia	November 2022	1	<0.0004	<0.0004	<0.0004	0.002mg/L (Health)	0	Council commenced testing in November 2022 and will undertake this test annually
Lead	Railway Street, Nelia	November 2022	1	0.0006	0.0006	0.0006	0.01mg/L (Health)	0	Council commenced testing in November 2022 and will undertake this test annually

3.1.2 Water Quality Complaints

Council has maintained a customer complaint record that identifies the date, resident name, type of complaint, the cause and corrective action. Table 3. below provides records from 2019/2020 to February 2022.

The number of dirty water complaints is insignificant and can be resolved with monitoring of the filter performance. The low-pressure issues were resolvable. These are generally low risk impacts.

Table 3.11 - Water Quality Complaints per Financial Year

Quality Issue	2019/2020	2020/2021	2021/2022	Comments
Dirty water Kynuna Water Scheme	1	0	2	• Flushing/cleaning of cartridge filters/replacement of media filters/new bore scheduled to be installed by June 2022
Low pressure Kynuna Water Scheme	0	3	1	• Cleaned cartridge filters/replacement of media filters/new bore scheduled to be installed by June 2022

3.1.3 Water Source Characteristics

Great Artesian Basin (GAB) Characteristics

McKinlay Shire Council's potable water sources are drawn from the GAB. Limited information is available on specific detail of the individual aquifers of each bore. Bore logs are available and held by Department of Regional Development, Manufacturing and Water (DRDMW)

The variation of the source water from deep bores is not expected to vary significantly and detail of the depths of the bores provide information on the surface interaction with the source water. These depths are in included in Section 2 above and are summarised as follows:

- Julia Creek: 344m to 370m
- McKinlay: 305m to 350m
- Kynuna: 670m to 677m
- Nelia: 396m

A summary of the GAB system is provided in Figure 3.1 below. The data was obtained from the former Department of Energy and Water Supply (DEWS) website and is circa 2004.

Basin or Aquifer Parameter	Value
Size of the GAB	1.7 million km^2
Maximum depth	3,000 m
Age of waters	up to 2 million years
Volume of water in storage	8,700 million ML
Current Basin bore discharge	1,560 ML/d or 570,000 ML/a
Total intake / recharge area	10 % of Basin area
Rainfall recharge	1 million ML/a
Recharge rate (average basin-wide)	1 - 2 % of total rainfall
Transmissivity	10 - 2,000 m^2/d
Hydraulic conductivity (k_h)	0.1 - 10 m/d
Porosity	10 - 30%
Average storage coefficient	1 $x10^{-4}$ to 1 x 10^{-5}
Potentiometric surface gradients	1:2,000 (approx.)
Maximum pressure	1,300 kilopascals
Temperature of water	average 30 - 50 ^{0}C, maximum 100 ^{0}C
Average groundwater velocities	1 - 5 m/a

ML/a = megalitres per annum (year), where 1 ML = million litres.

Figure 3.1 - Water Source Details (*Sourced from iGi Consulting*)

3.1.4 Bore Integrity Monitoring Program

Council conducts a bore logging program every 10 years. Records of logging are held by Council and saved into Council's Record Management System.

3.2 Hazard Identification

Hazards and hazardous events have been identified in Table 4.5 in Section 4 of this management plan. Hazards that have been identified to occur are based on characteristics of catchment, source and scheme along with historical information on the water quality and previous assessments completed by external consultants.

Hazard identification includes hazards that are extreme and infrequent events that are considered to have a magnifying effect (e.g. heavy rain, temperature extremes, and drought).

Note: Hazard identification and risk assessment have been combined into a single table because of the close link between these two steps in the process.

Responsible officers within McKinlay Shire Council for managing and delivering the water supply operations are:

- **Chief Executive Officer (CEO)**
  Overall control and responsibility for the implementation and application of the DWQMP.
- **Director of Engineering and Environmental Regulatory Services (DEERS)**
  Responsible for the maintenance, application of procedures and fulfilling objectives as defined in the DWQMP. Additionally, ensuring hazards and risks are assessed; managed and corrective actions are implemented.
- **Environmental and Regulatory Services Team Leader (ERS Team Leader)**
  Controls the day-to-day operations including capital works budgets and procurement, document control, records management and compliance reporting
- **Water and Sewerage Officer (WSO)**
  Undertakes the day-to-day operational works of water supply assets, reporting of non-conformances and identification of maintenance requirements. Additionally, assisting in capital and future planning improvement programs.

The organisational structure for the Environment and Regulatory Services Department is shown in Figure 3.2 below. The resource level for the day-to-day operations of the water supply schemes is limited to a single person.

Figure 3.2 - Environment and Regulatory Services Organisation Chart

Table 3.12 below details the personnel responsible for hazard identification and the risk assessment process, together with their qualifications, roles in the assessment, knowledge and experience.

Table 3.12 - Hazard Identification and Risk Assessment Team

Participant (Position)	Qualifications/ Expertise	Role in Assessment	Knowledge of Drinking Water Service	Experience in Hazard Identification/ Risk Assessment
Chief Executive Officer (CEO)	• B Engineering (Hons) • Grad Dip Municipal Engineering • RPEQ • CPEng • Local Government Engineers Certificate • Have worked as a Water Engineer in a local government and have a high degree of understanding of municipal water supply systems	Contributor	High	• 31 years of service in Local Government • Normal HI/RA through WH&S responsibilities and obligations
Director of Engineering, Environmental & Regulatory Services (DEERS)	• Diploma of Water Industry Operations • Diploma of Engineering and Surveying	Creator	High	• HACCP for Fluoride • Various projects risk assessments
Environmental & Regulatory Services Team Leader (ERS Team Leader)	• Diploma of Local Government (Planning) • Diploma of Project Management	Reviewer	High	• HACCP for Fluoride • Various projects risk assessments
Water and Sewerage Officer (WSO)	• Certificate III in Plumbing and Drainage	Contributor	Medium	• HACCP for Fluoride • Various projects risk assessments
Representative from Townsville Public Health Unit		Contributor	High	• HACCP for Fluoride • Component of certification

4 Assessment of Risks

Council utilises a holistic approach to hazard identification and risk management. The risk assessment methodology is based on the ADWG (2011) framework and industry guidance notes. Council utilises appropriate staff, consultants referencing industry standards, acts and regulations to obtain a positive and proactive methodology with identification of its risks and hazards associated in the operation and supply of its potable water networks.

Council has produced a water supply incident and emergency response plan detailing its methodology and processes in reaction to an identified incident or hazard. This forms part of Council's operational procedures. A copy of the response plan is provided in Appendix D of this Management Plan.

For each hazard and hazardous event, the likelihood and consequence together with the resultant level of risk were assessed using the ADWG (2011) framework scales tables below (refer to Tables 4.1, 4.2, 4.3). The level of certainty of the risk assessment is determined from the descriptions for each level in Table 4.4 below:

Table 4.1 - Likelihood Scale (ADWG 2011)

Level	Likelihood ranking	Description
A	Almost Certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur or should occur at some time
D	Unlikely	Could occur at some time
E	Rare	May occur only in exceptional circumstances

Table 4.2 - Consequence or Impact Scale (ADWG 2011)

Level	Consequence ranking	Description
1	Insignificant	Insignificant impact, little disruption to normal operation, low increase in normal operation costs
2	Minor	Minor impact for small population, some manageable operation disruption, some increase in operating costs
3	Moderate	Minor impact for large population, significant modification to normal operation but manageable, operation costs increased, increased monitoring
4	Major	Major impact for small population, systems significantly compromised and abnormal operation if at all, high level of monitoring required.
5	Catastrophic	Major impact for large population, complete failure of systems

Table 4.3 - Level of Risk Matrix (ADWG 2011)

Likelihood	Consequence				
	1 (Insignificant)	**2 (Minor)**	**3 (Moderate)**	**4 (Major)**	**5 (Catastrophic)**
A – Almost Certain	Moderate	High	Very High	Very High	Very High
B – Likely	Moderate	High	High	Very High	Very High
C – Possible	Low	Moderate	High	Very High	Very High
D – Unlikely	Low	Low	Moderate	High	Very High
E – Rare	Low	Low	Moderate	High	High

Table 4.4 - Certainty and Uncertainty Descriptions

Level of Certainty	Description (Examples for degrees of uncertainty)
Certain	There is five years of continuous monitoring data, which has been trended and assessed, with at least daily monitoring. The processes involved are thoroughly understood
Confident	5 years of continuous monitoring data, all collated and assessed, with monthly or weekly monitoring or for the duration of seasonal events. Good understanding of the data exists.
Reliable	There is at least a year of continuous monitoring data available, which has been assessed and there is a good understanding of the data.
Estimate	There is limited monitoring data available and there is a reasonable understanding of this data.
Uncertain	There is limited or no monitoring data available and the data is not well understood.

Table 4.5 – Julia Creek Hazard Identification, Risk Assessment and Level of Certainty

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
JC01	Bore Water	Bacteria and viruses in water	Contamination of water	Moderate	Unlikely	Moderate	*Secure bore heads *Monthly Water Quality Testing	Moderate	Rare	Moderate	Confident	Re-implement the use of the Colilert system for more regular sampling and additional samples during any events. Obtain quotes for new incubator/colilert test kits Make improvements to Julia Creek Laboratory by purchasing stainless steel bench tops, purchase of storage cupboard for sample bottles and repairs to walls Treat rusting on bore head bases on Hickman and Tower Bore Lay new concrete around base of bore head at Scour Bore Repair minor crack on stability platform at Tower Bore
JC02	Bore Water	Contamination	Hickman Street Pump Station in near vicinity of Hickman Water Bore	Moderate	Unlikely	Moderate	*Bore head is secured *Pump Station is a closed system *Hickman Bore is used for stock and construction purposes only. No drinking sign erected on site.	Moderate	Rare	Moderate	Confident	Nil
JC03	Bore Water	Contamination	Damaged or inadequately cased bore	Moderate	Unlikely	Moderate	*10 year Bore Logging Inspections *Backup bores	Moderate	Rare	Moderate	Confident	Repair damage as required
JC04	Bore Water	Contamination / Loss of Supply	Sabotage/Vandalism	Moderate	Rare	Moderate	*Regular site inspections *Fenced off / isolated area	Moderate	Rare	Moderate	Confident	Repair damaged security fencing as required Install padlock on Lions Park Bore
JC05	Bore Water	Bore Failure	Limited supply	Major	Unlikely	High	*Primary & Secondary Bores *10 Year Bore Logging Inspections *Lions Park Bore installed 2021 *Civic Bore refurbished 2021	Major	Rare	High	Confident	No further preventive measures. Risk considered to be as low as reasonably possible

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
JC06	Water Quality	Poor water quality	High Fluoride levels	Insignificant	Almost Certain	Moderate	*Fluoride Fact Sheet available on Council's Website for Community *Reporting excess levels to Regulator on a monthly basis	Insignificant	Almost Certain	Moderate	Confident	Nil
JC07	Balance Tank/Water Tower	Storage Tank failure	Structural damage to tank	Major	Unlikely	High	*Routine Visual Inspections *Water Tower refurbished in 2020 *5 yearly structural inspections if required *Annual Condition Inspection	Major	Rare	High	Confident	No further preventive measures. Risk considered to be as low as reasonably possible
JC08	Reticulation Network	No water reticulated	Power Outage	Moderate	Possible	High	*Automatic Generators on site *Monthly checks performed by Workshop Staff	Moderate	Rare	Moderate	Confident	Nil
	Reticulation Network	No water reticulated	Pump Failure	Moderate	Possible	High	*Daily checks *Backup pumps *Telemetry	Moderate	Rare	Moderate	Confident	Test backup pumps - 6 monthly frequency
JC09	Reticulation Network	Contamination	Mains Break	Moderate	Possible	High	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected water mains	Moderate	Unlikely	Moderate	Confident	Audit Water Mains Repair procedure
JC10	Reticulation Network	Water Quality	Build-up of sediments and slimes	Minor	Possible	Moderate	*Monthly HPC testing *Mains flushing when required	Minor	Unlikely	Low	Confident	Establish an air scouring program
JC11	Reticulation Network	Contamination	Aged or corroded infrastructure	Minor	Possible	Moderate	*Follow 'Water Main Repair' Procedure when required	Minor	Unlikely	Low	Confident	Develop a plan and timeline for replacement of oldest and most unreliable AC mains
JC12	Reticulation Network	Contamination	Infiltration and ingress from backflow	Minor	Possible	Moderate	*Backflow prevention devices installed on 100 connections *Monthly HPC testing *Follow repair procedures	Minor	Unlikely	Low	Confident	Backflow Prevention Capital Works Program on remaining household connections
JC13	Reticulation Network	Contamination	Infiltration and ingress from damaged pipes	Minor	Possible	Moderate	*Follow 'Water Main Repair' Procedure, including localised disinfection of the affected pipework when required	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
JC14	Reticulation Network	Contamination	Inadequate disinfection after pipeline repairs	Minor	Possible	Moderate	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
							affected pipework *Monthly HPC Testing					
JC15	Reticulation Network	Customer Complaints	Flow variability, Inadequate pressure, Water quality	Minor	Possible	Moderate	*Daily checks *Regular water sampling and analysis for water quality complaints	Minor	Unlikely	Low	Confident	Follow up on causes of customer complaints in accordance with procedures
JC16	Corporate Risk	Cyber Security Risk	Hacking	Minor	Unlikely	Low	*No online telemetry, no intranet. Telemetry unit located in locked Depot Building	Minor	Unlikely	Low	Confident	Nil
JC17	Regulatory Requirements	DWQMP Sampling Requirements	Failure to comply with Verification Monitoring Program	Insignificant	Possible	Low	*Implemented a reminder alert in Outlook for monthly testing *Additional staff members trained in the absence of WSO	Insignificant	Unlikely	Low	Reliable	Review procedure reliability
JC18	Regulatory Requirements	Training	Inadequately trained staff	Minor	Possible	Moderate	*General induction covering procedures performed for new staff members	Minor	Unlikely	Low	Reliable	Investigate into enrolling additional staff member in the Certificate III in Water Industry Operations Course Training to be provided to water supply staff in all water supply functions including SWIMLocal software, incident reporting, with refresher training to be conducted at least once per year
JC19	Bore Water	Opportunistic pathogens/Legionella and Naegleria	Contamination of water	Insignificant	Almost Certain	Moderate	Nil	Insignificant	Almost Certain	Moderate	Reliable	Annual sampling Fact Sheet to be prepared for the community regarding ways to mitigate exposure Testing for Naegleria to be undertaken

Table 4.6 – Kynuna Hazard Identification, Risk Assessment and Level of Certainty

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
K01	Bore Water	Bacteria and viruses in water	Contamination of water	Minor	Unlikely	Low	*Secure bore head *Monthly Water Quality Testing	Minor	Rare	Low	Confident	Re-implement the use of the Colilert system for more regular sampling and additional samples during any events.
K02	Bore Water	Contamination	Damaged or inadequately cased bore	Minor	Unlikely	Low	*10 year Bore Logging Inspections	Minor	Rare	Low	Confident	Nil
K03	Bore Water	Contamination / Loss of Supply	Sabotage/Vandalism	Minor	Unlikely	Low	*Regular site inspections *Fenced off / isolated area	Minor	Rare	Low	Confident	Repair damaged security fencing as required
K04	Bore Water	Bore Failure	Limited supply	Minor	Unlikely	Low	*10 year Bore Logging Inspections *Back up water cart if required	Minor	Rare	Low	Confident	Nil
K05	Water Quality	Poor water quality	High Iron and Manganese Levels	Insignificant	Almost Certain	Moderate	*Medium and membrane filtration system	Insignificant	Almost Certain	Moderate	Confident	Regular replacement of media in IRS4000 filters and cartridge filters Additional treatment options
K06	Storage Tank	Contamination / Poor Water Quality	Vermin	Minor	Unlikely	Low	*Bird Proofing *Monthly Visual Inspections	Minor	Rare	Low	Confident	Nil
K07	Storage Tank	Bacteria and viruses in water	Contamination of water	Minor	Likely	High	*Monthly visual inspections	Minor	Likely	High	Reliable	Investigate into regular cleaning program of storage units Improve checks to include more data Consider conducting inspections twice per month
K08	Storage Tank	Fall from Heights	Contamination of water	Minor	Almost Certain	High	Nil	Minor	Almost Certain	High	Reliable	Upgrades to ladder and platform
K09	Storage Tank	Storage Tank Failure	Structural damage to tank	Major	Unlikely	Moderate	*Monthly Site Inspections	Major	Rare	Moderate	Confident	Continue to monitor storage tank condition and provide capital investment as necessary
K10	Storage Tank	Water Quality	Build-up of sediments and slimes	Minor	Likely	High	*Monthly Water Quality Testing	Minor	Likely	High	Confident	Investigate into regular cleaning program of storage units
K11	Reticulation Network	No water reticulated	Power Outage	Minor	possible	Moderate	*Automatic Generator on site *Monthly checks performed by Workshop Staff	Minor	Unlikely	Low	Confident	Nil
K12	Reticulation Network	No water reticulated	Pump Failure	Minor	Possible	Moderate	*Monthly Inspections *Backup pump *Telemetry	Minor	Unlikely	Low	Confident	Test backup pumps - 6 monthly frequency

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
K13	Reticulation Network	Contamination	Mains Break	Minor	Possible	Moderate	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected water mains	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
K14	Reticulation Network	Water Quality	Build-up of sediments and slimes	Minor	Possible	Moderate	*Monthly HPC testing *Mains flushing when required	Minor	Unlikely	Low	Confident	Establish an air scouring program
K15	Reticulation Network	Contamination	Aged or corroded infrastructure	Minor	Possible	Moderate	*Follow 'Water Main Repair' Procedure when required	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
K16	Reticulation Network	Contamination	Infiltration and ingress from backflow	Minor	Possible	Moderate	*Monthly HPC testing *Follow repair procedures	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
K17	Reticulation Network	Contamination	Infiltration and ingress from damaged pipes	Minor	Possible	Moderate	*Follow 'Water Main Repair' Procedure, including localised disinfection of the affected pipework when required	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
K18	Reticulation Network	Contamination	Inadequate disinfection after pipeline repairs	Minor	Possible	Moderate	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected pipework *Monthly HPC Testing	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
K19	Reticulation Network	Customer Complaints	Flow variability, Inadequate pressure, Water quality	Minor	Likely	High	*Monitor flows/pressures through Telemetry *Regular cleaning of cartridge filters *Replacement of media and riser pipe screen in IRS4000 filters	Minor	Possible	Moderate	Confident	Replacement of media in IRS4000 filters every 2-3 years Replacement of riser pipe screen in IRS4000 filters every 12 months Follow up on causes of customer complaints in accordance with procedures
K20	Corporate Risk	Cyber Security Risk	Hacking	Minor	Unlikely	Low	*No online telemetry, no intranet *Telemetry unit located in locked Depot Building	Minor	Rare	Low	Confident	Nil

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
K21	Regulatory Requirements	ADWG Guidelines	Failure to comply with verification monitoring program	Insignificant	Possible	Moderate	*Implemented a reminder alert in Outlook for monthly testing. *Additional staff trained in the absence of WSO	Insignificant	Unlikely	Low	Reliable	Review procedure reliability
K22	Regulatory Requirements	Training	Inadequately trained staff	Minor	Possible	Moderate	*General induction covering procedures performed for new staff members	Minor	Unlikely	Low	Reliable	Investigate into enrolling additional staff member in the Certificate III in Water Industry Operations Course Training to be provided to water supply staff in all water supply functions including SWIMLocal software, incident reporting, with refresher training to be conducted at least once per year
K23	Bore Water	Opportunistic pathogens/Legionella and Naegleria	Contamination of water	Insignificant	Almost Certain	Moderate	Nil	Insignificant	Almost Certain	Moderate	Reliable	Annual sampling Fact Sheet to be prepared for the community regarding ways to mitigate exposure Testing for Naegleria to be undertaken

Table 4.7 – McKinlay Hazard Identification, Risk Assessment and Level of Certainty

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
M01	Bore Water	Bacteria and viruses in water	Contamination of water	Minor	Possible	Moderate	*Secure bore heads *Monthly Water Quality Testing	Minor	Unlikely	Low	Confident	Re-implement the use of the Colilert system for more regular sampling and additional samples during any events.
M02	Bore Water	Contamination	Damaged or inadequately cased bore	Moderate	Unlikely	Moderate	*Bore refurbished *Monthly bore checks *10 year Bore Logging Inspections	Moderate	Rare	Moderate	Confident	Repair damage as required
M03	Bore Water	Contamination / Loss of Supply	Sabotage/Vandalism	Minor	Unlikely	Low	*Regular site inspections *Fenced off / isolated area	Minor	Rare	Low	Confident	Repair damaged security fencing as required
M04	Bore Water	Bore Failure	Limited supply	Moderate	Unlikely	Moderate	*Bore refurbished *10 year Bore Logging Inspections *Back up water cart if required	Moderate	Rare	Moderate	Confident	Nil
M05	Water Quality	Poor water quality	High Fluoride Levels	Insignificant	Possible	Low	*Monthly Water Quality Sampling *Report exceedance to Regulator	Insignificant	Possible	Low	Confident	Nil
M06	Storage Tank	Contamination / Poor Water Quality	Vermin	Minor	Unlikely	Low	*Bird Proofing *Monthly Visual Inspections	Minor	Rare	Low	Confident	Repair bird proofing as necessary
M07	Storage Tank	Bacteria and viruses in water	Contamination of water	Minor	Likely	High	*Monthly visual inspections	Minor	Likely	High	Reliable	Investigate into regular cleaning program of storage units Improve checks to include more data Consider conducting inspections twice per month
M08	Storage Tank	Fall from Heights	Contamination of water	Minor	Almost Certain	High	Nil	Minor	Almost Certain	High	Reliable	Council to engage Structural Engineer to assess and report on repairs to tin platforms
M09	Storage Tank	Storage Tank Failure	Structural damage to tank	Moderate	Unlikely	Moderate	*Monthly Site Inspections	Moderate	Rare	Moderate	Confident	Continue to monitor storage tank condition and provide capital investment as necessary
M10	Reticulation Network	No water reticulated	Power Outage	Minor	Unlikely	Low	*Automatic Generator on site *Monthly checks performed by Workshop Staff	Minor	Rare	Low	Confident	Nil

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
M11	Reticulation Network	No water reticulated	Pump Failure	Moderate	Unlikely	Moderate	*Monthly Inspections *Backup pump *Water carting if needed	Moderate	Rare	Moderate	Confident	Test backup pumps - 6 monthly frequency
M12	Reticulation Network	Contamination	Mains Break	Minor	Possible	Moderate	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected water mains	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
M13	Reticulation Network	Water Quality	Build-up of sediments and slimes	Minor	Possible	Moderate	*Monthly HPC testing *Weekly flushing	Minor	Unlikely	Low	Confident	Establish an air scouring program
M14	Reticulation Network	Contamination	Aged or corroded infrastructure	Minor	Possible	Moderate	*Follow 'Water Main Repair' Procedure when required	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
M15	Reticulation Network	Contamination	Infiltration and ingress from backflow	Minor	Possible	Moderate	*Monthly HPC testing *Follow repair procedures	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
M16	Reticulation Network	Contamination	Infiltration and ingress from damaged pipes	Minor	Possible	Moderate	*Follow 'Water Main Repair' Procedure, including localised disinfection of the affected pipework when required	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
M17	Reticulation Network	Contamination	Inadequate disinfection after pipeline repairs	Minor	Possible	Moderate	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected pipework *Monthly HPC Testing	Minor	Unlikely	Low	Confident	Audit Water Mains Repair procedure
M18	Reticulation Network	Customer Complaints	Water quality	Minor	Possible	Moderate	*Regular water sampling and analysis for water quality complaints	Minor	Unlikely	Low	Confident	Follow up on causes of customer complaints in accordance with procedures
M19	Corporate Risk	Cyber Security Risk	Hacking	Minor	Unlikely	Low	*No online telemetry, no intranet	Minor	Rare	Low	Confident	Nil

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
M20	Regulatory Requirements	ADWG Guidelines	Failure to comply with verification monitoring program	Insignificant	Unlikely	Low	*Implemented a reminder alert in Outlook for monthly testing *Additional staff members trained in the absence of WSO	Insignificant	Rare	Low	Reliable	Review procedure reliability
M21	Regulatory Requirements	Training	Inadequately trained staff	Minor	Possible	Moderate	*General induction covering procedures performed for new staff members	Minor	Unlikely	Low	Reliable	Investigate into enrolling additional staff member in the Certificate III in Water Industry Operations Course Training to be provided to water supply staff in SWIMLocal software, incident reporting, treatment plant operation, turbidity testing with refresher training to be conducted at least once per year
M22	Bore Water	Opportunistic pathogens/Legionella and Naegleria	Contamination of water	Insignificant	Almost Certain	Moderate	Nil	Insignificant	Almost Certain	Moderate	Reliable	Annual sampling Fact Sheet to be prepared for the community regarding ways to mitigate exposure Testing for Naegleria to be undertaken

Table 4.8 – Nelia Hazard Identification, Risk Assessment and Level of Certainty

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
N01	Bore Water	Bacteria and viruses in water	Contamination of water	Minor	Unlikely	Low	*Secure bore heads *Monthly Water Quality Testing	Minor	Rare	Low	Confident	Re-implement the use of the Colilert system for additional samples during any events
N02	Bore Water	Contamination	Damaged or inadequately cased bore	Minor	Unlikely	Low	*Monthly bore checks *10 year Bore Logging Inspections	Minor	Unlikely	Low	Confident	Repair damage as required
N03	Bore Water	Contamination / Loss of Supply	Sabotage/Vandalism	Minor	Unlikely	Low	*Regular site inspections *Fenced off / isolated area	Minor	Rare	Low	Confident	Repair damaged security fencing as required
N04	Bore Water	Bore Failure	Limited supply	Minor	Unlikely	Low	*10 year Bore Logging Inspections *Back up water cart if required	Moderate	Unlikely	Low	Confident	Nil
N05	Reticulation Network	Contamination	Mains Break	Minor	Unlikely	Low	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected water mains	Minor	Rare	Low	Confident	Audit Water Mains Repair procedure
N06	Reticulation Network	Water Quality	Build-up of sediments and slimes	Minor	Unlikely	Low	*Monthly HPC testing *Flushing if required	Minor	Unlikely	Low	Confident	Establish an air scouring program
N07	Reticulation Network	Contamination	Aged or corroded infrastructure	Minor	Rare	Low	*Follow 'Water Main Repair' Procedure when required	Minor	Rare	Low	Confident	Audit Water Mains Repair procedure
N08	Reticulation Network	Contamination	Infiltration and ingress from backflow	Minor	Unlikely	Low	*Monthly HPC testing *Follow repair procedures	Minor	Rare	Low	Confident	Audit Water Mains Repair procedure
N09	Reticulation Network	Contamination	Infiltration and ingress from damaged pipes	Minor	Rare	Low	*Follow 'Water Main Repair' Procedure, including localised disinfection of the affected pipework when required	Minor	Rare	Low	Confident	Audit Water Mains Repair procedure
N10	Reticulation Network	Contamination	Inadequate disinfection after pipe line repairs	Minor	Unlikely	Low	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected pipework *Monthly HPC Testing	Minor	Rare	Low	Confident	Audit Water Mains Repair procedure

Risk Assessment Item #	Component	Hazard	Hazardous Event	Maximum Risk			Existing Preventative Measures / Barriers	Residual Risk			Uncertainty	Comments / Proposed Further Risk Reduction Actions (Risk Management Improvement Plan)
				Consequence	Likelihood	Risk Level		Consequence	Likelihood	Risk Level		
N11	Corporate Risk	Cyber Security Risk	Hacking	Minor	Unlikely	Low	*No online telemetry, no intranet	Minor	Rare	Low	Confident	Nil
N12	Regulatory Requirements	ADWG Guidelines	Failure to comply with verification monitoring program	Insignificant	Unlikely	Low	*Implemented a reminder alert in Outlook for monthly testing *Additional staff members trained in the absence of WSO	Insignificant	Rare	Low	Reliable	Review procedure reliability
N13	Regulatory Requirements	Training	Inadequately trained staff	Minor	Unlikely	Low	*General induction covering procedures performed for new staff members	Minor	Unlikely	Low	Reliable	Investigate into enrolling additional staff member in the Certificate III in Water Industry Operations Course Training to be provided to water supply staff in SWIMLocal software, incident reporting, treatment plant operation, turbidity testing with refresher training to be conducted at least once per year
N14	Bore Water	Opportunistic pathogens/Legionella and Naegleria	Contamination of water	Insignificant	Almost Certain	Moderate	Nil	Insignificant	Almost Certain	Moderate	Reliable	Annual sampling Fact Sheet to be prepared for the community regarding ways to mitigate exposure Testing for Naegleria to be undertaken

5 Management of Risks

5.1 Managing Risk

McKinlay Shire Council accept all residual risks of low and moderate with level of certainty reliable and above. All high and very high residual risks are unacceptable however in some instances when no further preventive measure can be applied to reduce the risk Council will accept these risks to be as low as reasonably possible. Table 5.1 below sets out the defined acceptable risk levels.

Table 5.1 – Defined acceptable risk levels

Residual Risk Level	Acceptability
Low	• All low residual risks - Acceptable
Moderate	• All moderate residual risks with level of certainty Reliable and above – Acceptable Review risk control measures annually • All moderate residual risks with level of certainty below Reliable – Unacceptable
High	• All high risks – Unacceptable High risks with moderate and major consequences but rare likelihood with significant lead times - Qualified Acceptance subject to annual review for risk control
Very High	• All very high risks - Unacceptable

The existing preventable measures and the proposed measures for each of the hazards identified in the scheme components are summarised below in Table 5.2. The effectiveness of the existing preventable measure is noted along with the level of residual risk acceptability. The responsible role within the organisation has also been identified to ensure the accountability implementation of the preventative measure is known and included in the work activity and reporting of outcomes.

Table 5.2 – Existing and Proposed Preventative Measures

1 Scheme Component/Sub-component	2 Hazard	3 Hazardous Event	4 Existing Preventative Measures/Barriers	5 Which risk factor/s does the existing preventative measure/s impact on? (i.e. likelihood &/or consequence)	6 How effective is/are the existing preventative measure/s & on what basis has been determined	7 Is the level of residual risk acceptable	8 Proposed measures to reach an acceptable level or residual risk	9 Responsible Work Unit/Organisation (arrangements with external organisation if applicable)
All schemes Bore Water	Bacteria and viruses in water	Contamination of water	*Secure bore heads *Monthly Water Quality Testing	Likelihood & Consequence	Effective	Yes	Re-implement the use of the Colilert system for more regular sampling and additional samples during any events. Obtain quotes for new incubator/colilert test kits Make improvements to Julia Creek Laboratory by purchasing stainless steel bench tops, storage cupboard for sample bottles and repairs to walls Repair cracks and rusting on bore heads	Environmental & Regulatory Services Department
Julia Creek Bore Water	Contamination	Hickman Street Pump Station in near vicinity of Hickman Water Bore	*Bore head is secured *Pump Station is a closed system *Hickman Bore is used for stock and construction purposes only. No drinking sign erected on site	Likelihood & Consequence	Effective	Yes	No further measures	Environmental & Regulatory Services Department
All schemes Bore Water	Contamination	Damaged or inadequately cased bore	*10 year Bore Logging Inspections *Backup Bores	Likelihood	Effective, but costly to monitor and assess	Yes	Repair damage as required.	Environmental & Regulatory Services Department
All schemes Bore Water	Contamination	Sabotage/Vandalism	*Regular site inspections *Fenced off/isolated area	Likelihood	Effective	Yes	Repair damaged security fence as required Install new padlock on Lions Bore gate	Environmental & Regulatory Services Department
All schemes Bore Water	Bore Failure	Limited Supply	*Primary & Secondary Bores	Likelihood & Consequence	Effective	Yes	Continue to monitor bore condition and provide	Director of Engineering and Environmental

			*10 Year Bore Logging Inspections *Lions Park Bore in Julia Creek installed 2021 *Civic Bore in Julia Creek and bore in McKinlay refurbished *Back up water cart to townships available if required				capital investment as necessary.	Regulatory Services
Julia Creek & McKinlay Water Quality	Poor Water Quality	High Fluoride Levels	*Fluoride Fact Sheet available on Council's Website for Community *Reporting excess levels to Regulator on a monthly basis	Likelihood & Consequence	Not effective in achieving NHRC limits Options limited	Yes	Continue to monitor fluoride levels and communicate with Regulator and Community on a monthly basis	Environmental & Regulatory Services Department
Kynuna Water Quality	Poor Water Quality	High Iron and Manganese Levels	*Medium and membrane filtration system	Likelihood & Consequence	Semi effective, levels drop significantly from the bore to the reticulation however are still just above the aesthetic limits	Yes	Continue regular cleaning of cartridge filters and schedule in the replacement of media and riser pipe screens in IRS4000 filters Consider additional treatment options	Environmental & Regulatory Services Department
Julia Creek, Kynuna and McKinlay Balance Tank/Water Tower and Storage Tanks	Storage Failure	Structural Damage to tank	*Routine Visual Inspections *Water Tower refurbished in 2020 *5 yearly structural inspections if required *Annual Condition Inspections *Monthly Site Inspections in Kynuna and McKinlay	Likelihood & Consequence	Effective	Yes	Include in Asset Management Plan for Julia Creek Continue to monitor storage tank condition and provide capital investment as necessary	Environmental & Regulatory Services Department
Kynuna & McKinlay Storage Tanks	Contamination/Poor Water Quality	Vermin	*Bird Proofing *Monthly Visual Inspections	Likelihood & Consequence	Effective	Yes	Include in Asset Management Plans Repair bird proofing as necessary	Environmental & Regulatory Services Department
Kynuna & McKinlay Storage Tanks	Bacteria and viruses in water	Contamination of Water	*Monthly visual inspections	Likelihood & Consequence	Not effective	No	Investigate into regular cleaning program Improve checks to include more data Consider conducting inspections twice per month	Environmental & Regulatory Services Department
Kynuna & McKinlay Storage Tanks	Fall from Heights	Contamination of Water/Workplace Health and Safety Issue	Nil	Likelihood & Consequence	Not effective	No	Upgrades in Capital Works Budget for 2021-23 for Kynuna ladder/platform Council to engage Structural Engineer to assess and report on repairs to tin platforms at McKinlay	Environmental & Regulatory Services Department
Kynuna Storage Tanks	Water Quality	Build-up of sediments and slimes	*Monthly Water Quality Testing	Likelihood & Consequence	Not Effective	No	Investigate into regular cleaning program	Environmental & Regulatory Services Department
Julia Creek, Kynuna and McKinlay Reticulation Network	No water reticulated	Power Outage	*Automatic Generators on site	Likelihood & Consequence	Effective	Yes	Continue to inspect generators on a monthly basis	Workshop Department
Julia Creek, Kynuna and McKinlay Reticulation Network	No water reticulated	Pump Failure	*Daily Checks in Julia Creek *Monthly Checks in Kynuna & McKinlay *Backup Pumps *Telemetry for Julia Creek and Kynuna Schemes	Likelihood & Consequence	Effective	Yes	Test backup pumps - 6 monthly frequency	WSO
All schemes Reticulation Network	Contamination	Mains Break	*Follow 'Water Main Repair' Procedure, including localised disinfection of the affected water mains when required	Likelihood	Effective	Yes	WSO and External Contractors to be made aware of procedure	Environmental & Regulatory Services Department and External Contractors

All schemes Reticulation Network	Water Quality	Build-up of sediments and slimes	*Monthly HPC testing *Mains flushing when required	Likelihood	Effective subject to frequency	Yes	Establish an air scouring program	Environmental & Regulatory Services Department
All schemes Reticulation Network	Contamination	Aged or corroded infrastructure	*Follow 'Water Main Repair' Procedure when required	Likelihood	Effective subject to frequency	Yes	Develop a plan and timeline for replacement of oldest and most unreliable AC mains in Julia Creek	Environmental & Regulatory Services Department
All schemes Reticulation Network	Contamination	Infiltration and ingress from backflow	*Backflow prevention devices installed on 100 connections in Julia Creek *Monthly HPC testing *Follow repair procedures	Likelihood	Effective	Yes	Backflow Prevention Capital Works Program required on remaining household connections in Julia Creek	Environmental & Regulatory Services Department
All schemes Reticulation Network	Contamination	Infiltration and ingress from damaged pipes	*Follow 'Water Main Repair' Procedure, including localised disinfection of the affected pipework when required	Likelihood	Effective	Yes	WSO and External Contractors to be made aware of procedure	Environmental & Regulatory Services Department and External Contractors
All schemes Reticulation Network	Contamination	Inadequate disinfection after pipeline repairs	*Follow 'Water Main Repairs' Procedure, including localised disinfection of the affected pipework	Likelihood	Effective	Yes	WSO and External Contractors to be made aware of procedure	Environmental & Regulatory Services Department and External Contractors
All schemes Reticulation Network	Customer Complaints	Flow variability, inadequate pressure, water quality	*Daily Checks in Julia Creek *Monthly Checks in all other townships *Monitor flows through Telemetry for Kynuna *Regular cleaning of cartridge filters in Kynuna *Regular water sampling and analysis for water quality complaints	Likelihood	Semi-effective	Yes	Continue to monitor pressure levels on daily/monthly checks in all townships. Continue to monitor telemetry and clean cartridge filters in Kynuna Follow up on causes of customer complaints in accordance with procedures	Environmental & Regulatory Services Department
All schemes Corporate Risk	Cyber Security Risk	Hacking	*No online telemetry, no intranet. *Telemetry unit located in locked Depot Building	Likelihood	Effective	Yes	No further measures	Environmental & Regulatory Services Department
All schemes Regulatory Requirements	DWQMP Sampling Requirements	Failure to comply with Verification Monitoring Program of DWQMP	*Implemented a reminder alert in Outlook for monthly testing *Additional staff members trained in absence of WSO	Likelihood	Effective	Yes	Review procedure reliability	WSO and ERS Team Leader
All schemes Regulatory Requirements	Training	Inadequately trained staff	*General induction covering procedures performed with new staff members	Likelihood	Effective	Yes	Investigate into enrolling additional staff member in the Certificate III in Water Industry Operations Course Training to be provided to water supply staff in SWIMLocal software, incident reporting, treatment plant operation, turbidity testing with refresher training to be conducted at least once per year	Environmental & Regulatory Services Department
All schemes Bore Water	Opportunistic pathogens/Legionella and Naegleria	Contamination of water	Nil	NA	NA	NA	Council to prepare fact sheet in consultation with the Public Health Unit for the community on ways to minimise exposure	Environmental & Regulatory Services Department

5.2 Operation and Maintenance Procedures

Council undertakes a dynamic process for the identification, control and mitigation of its operational risks. These have resulted in the development and publication of the operational procedures to assist in the management of the risks. A summary of these operational procedures is shown in Table 5.3 below:

Table 5.3 - Operational Procedures

Procedure (incl version number)	Purpose	Date last reviewed	Frequency of review	Responsible position for review and implementation
Distribution System Maintenance Procedure v2	To enable Council to address the day-to-day continuity of water supply operation and adequacy and quality of water supply systems.	March 2022	Annually	Environmental & Regulatory Services Team Leader
Monitoring Customers Complaints Procedure v2	To summarise the process for customer interaction with the Council as the Service Provider	March 2022	Annually	Environmental & Regulatory Services Team Leader
Reservoir Integrity and Bore Head Maintenance Procedure v2	To provide readily accessible procedure in maintaining the integrity of the reservoir/storage tanks in order to maintain safe drinking water to the public.	March 2022	Annually	Environmental & Regulatory Services Team Leader
Water Mains Repair Procedure v2	To ensure all the works being performed for water main repairs comply with hygienic processes in order to maintain safe drinking water to the public.	March 2022	Annually	Environmental & Regulatory Services Team Leader
Water Network Operation Philosophy v2	To provide mechanisms that trigger change in operational protocols in response to changes in water quality, quantity and demand.	March 2022	Annually (earlier if required)	Environmental & Regulatory Services Team Leader
Water Monitoring / Sampling Procedure v2	To outline to process of the routine monthly testing program.	March 2022	Annually	Environmental & Regulatory Services Team Leader
Julia Creek Community Notification Procedure v2	To notify the residents of Julia Creek when the levels of fluoride in the drinking water supply is elevated.	March 2022	Annually	Environmental & Regulatory Services Team Leader
Generator Checklists v1	To ensure that backup power supply is regularly checked	March 2022	Annually	Environmental & Regulatory Services Team Leader
Kynuna Water Treatment Plant Maintenance v1	To outline the process for the regular maintenance of the Kynuna Water Treatment Plant	March 2022	Annually (earlier if required)	Environmental & Regulatory Services Team Leader

Each of these procedures are utilised as guidelines and processes to minimise Council's exposure to risk and hazards resulting in a reduction of the overall risk to its communities and customers.

All procedures are reviewed annually by the ERS Team Leader to ensure all content is accurate. The procedures are saved into Council's InfoXpert System under the following file path: *Document Library/User Workspace/Water and Sewerage/DWQMP/Procedures*. Each procedure is given a version number with an expiration date is set and a notification is sent to the document holder that the procedure requires a review.

When new staff are employed within the Environmental & Regulatory Services Department, they are provided with a general induction that covers the content on all procedures. A copy of the procedures is also located within the Water and Sewerage Officer folder for review on site if required.

Other procedures that are to be implemented are 'Sodium Hypochlorite Handling/Storage Procedure' and 'Water Tower Works Inspection Procedure'. These are expected to be developed by early 2023. This is outlined in the Risk Management Improvement Section of this plan.

In addition to operational procedures, Council has developed a reporting program to ensure the accountability of management to the water supply for the community. Any exceptions are to be addressed in accordance with the risk management approach. High frequency of asset and system performance will trigger consideration for inclusion in the next review of the DWQMP or if considered as an emergency, then the management of incidents and emergency is activated. Table 5.4 below provides detail on the operational monitoring and reporting program.

Table 5.4 - Operational Monitoring and Reporting Program

Monitoring Area	Monitoring Details	Frequency of Monitoring	Monitoring Location (Scheme)
Pipeline integrity	Refer to Walkover Inspections, Section 4.1 of the Distribution System Maintenance Procedure	Daily in Julia Creek Monthly in Kynuna, McKinlay and Nelia	All
Mains Flushing	Refer to Section 4.2 Mains Flushing Procedure of the Distribution System Maintenance Procedure for routine network flushing	As required through testing and customer response	All
Turbidity	**Council obtaining quotes for a handheld Turbidity Meter to measure water turbidity in addition to the lab testing results.*	Monthly and as required *Council to consider twice monthly. See RMIP for more information	Kynuna
Customer complaints	Refer to Monitoring Customer Complaints Procedure	Ongoing	All
Mains repair	Refer to the Distribution System Maintenance Procedure	Event related	All
Water quality monitoring	Refer to the Verification Monitoring Program and the Julia Creek Community Notification Procedure	As per the Verification Monitoring Program	All
Service reservoir integrity regular examinations	Refer to Section 4.1 of the Reservoir Integrity and Bore Head Maintenance Procedure	Monthly – Visual Annually - Regular	Kynuna Julia Creek McKinlay
Service reservoir integrity Internal inspections	Refer to Section 4.1 of the Reservoir Integrity and Bore Head Maintenance Procedure	5 years if required	Kynuna Julia Creek McKinlay
Main valve monitoring	Refer to Section 4.3 of the Distribution System Maintenance Procedure and under Section 4.2 of the Water Mains Repairs Procedure	Valve checked on any main break	All
Bore head pump operation and bore head integrity	Refer to Section 4.2 of the Reservoir Integrity and Bore Head Maintenance Procedure	Daily in Julia Creek Monthly in Kynuna, McKinlay and Nelia	All
Network Isolation	Refer to Section 4.2 of the Distribution System Maintenance Procedure for Mains Flushing Procedure	Event related	All
Power outage	Generator Checklist completed by Workshop Staff	Monthly	All
Kynuna Water Treatment Plant	Refer to Kynuna Water Treatment Plant Maintenance Procedure.	Monthly *Council to consider twice monthly. See RMIP for more information	Kynuna

Council has developed the following *Customer Complaint and Response System* outlined in Table 5.5 below, which is in line with the requirements of the ADWG and its responsibilities as a drinking water provider.

Table 5.5 - Customer Complaint and Response System (CRM)

Customer Complaint	Response System	Additional Actions	CRM system and Records
Dirty water	• CRM requests are delivered to the responsible Officer • Assessment of the source of the CRM is undertaken • Corrective action is undertaken	• Works are documented • CRM is closed	Councils InfoXpert system and operational H: drive
Bad or foul taste	• CRM requests are delivered to the responsible Officer • Assessment of the source of the CRM is undertaken • Corrective action is undertaken	• Works are documented • CRM is closed	Councils InfoXpert system and operational H: drive
Odour complaints	• CRM requests are delivered to the responsible Officer • Assessment of the source of the CRM is undertaken • Corrective action is undertaken	• Works are documented • CRM is closed	Councils InfoXpert system and operational H: drive
Low pressure	• CRM requests are delivered to the responsible Officer • Assessment of the source of the CRM is undertaken • Corrective action is undertaken	• Works are documented • CRM is closed	Councils InfoXpert system and operational H: drive
Loss of supply	• CRM requests are delivered to the responsible Officer • Assessment of the source of the CRM is undertaken • Corrective action is undertaken	• Works are documented • CRM is closed	Councils InfoXpert system and operational H: drive
Service Failure	• CRM requests are delivered to the responsible Officer • Assessment of the source of the CRM is undertaken • Corrective action is undertaken	• Works are documented • CRM is closed	Councils InfoXpert system and operational H: drive
Other general	• CRM requests are delivered to the responsible Officer • Assessment of the source of the CRM is undertaken • Corrective action is undertaken	• Works are documented • CRM is closed	Councils InfoXpert system and operational H: drive

Note: Additional activities outside general actions will be based on individual assessments and requirements. E.g. contractor, capital works programs or tenders.

5.3 Management of Incidents and Emergencies

McKinlay Shire Council has policies and procedures that formally set the guidelines for the control of identified incidents within its networks. The Incident and Emergency Response Plan (IERP) is included in Appendix D of this management plan. Council will annually test the IERP and update the plan as necessary, in particular the emergency contacts. Review of the IERP will also be used for staff refreshers and training in the use of the IERP. The following Table 5.6 and Table 5.7 outline the threat and incident levels as a summary of the IERP:

Table 5.6 - Incident / Emergency Levels

Incident / Emergency Level	Description of Level
Level 3	*Major disaster or emergency, such as:* • *Widespread outbreak of waterborne disease* • *Declared disaster* • *Localised emergency impacting on water quality (e.g. industrial spill, accidents)* • *Terrorist or deliberate contamination threat*
Level 2	*Event with a high risk of causing illness and/or affecting a large number of customers, such as:* • *Detection of E. coli in the reticulation system* • *Exceedance of ADWG health guideline value for a chemical parameter (Fluoride)* • *Failure of infrastructure (severe or emergency level supply or supply disruption to over 50 customers for over 3 hours) through power outage, distribution line break, source pump failure etc.* • *An event that is likely to have resulted in the delivery of contaminated water to customers or where the delivery of contaminated water cannot be prevented e.g. backflow or back siphonage, flooding* • *Gross exceedance of ADWG health guideline values for a chemical parameter (value of exceedance is more than 5 times the ADWG health guideline limit).*

Level 1	• *Exceedance of ADWG aesthetic limit, for example turbidity, colour, Sodium levels or PH* • *Increased concentration of Total Coliforms*

Table 5.7 - Management of Incidents and Emergencies

Incident / Emergency Level Level and Incident Description	**Positions Responsible for Actions and Contact Details**	**Investigation and Management Actions (Summary of Actions to be Taken)**
Major disaster or emergency, such as: • Widespread outbreak of waterborne disease • Declared disaster • Localised emergency impacting on water quality (e.g. industrial spill, accidents) • Terrorist or deliberate contamination threat	Emergency Response Lead (EML) - Director of Engineering and Environmental Regulatory Services Phone: (07) 4746 7166 Mobile: 0427 470 009 Environmental & Regulatory Services Team Leader - Alternate Emergency Response Lead (AEML) Phone: (07) 4746 7166 Mobile: 0437 228 062 Water & Sewerage Officer Phone: 0429 464 004 Other Council Staff as required. External Agencies: • RDMW • Queensland Health • Queensland Police • NATA Accredited Laboratory	• Report detection to DRDMW immediately by phone **(1300 596 709)** • Notify Council CEO and Internal Communications Department • Notify Police • Contact Queensland Health for assistance with contamination events • Isolate affected area (e.g., isolation valves, plugs, caps and seals and/or disengage supply pumps) • Potential action and control; Arrange alternative water sources, issue boil water alerts • Notify critical customers as per requirements under the MSC Incident and Emergency Response Plan • Coordinate community messaging by placing information on Notice Boards, Council Website and Council Facebook page • Investigate causes of contamination • Instigate remediation as per Council's policies and procedures • Notify all users when water supply is safe / supply is resumed • Review emergency/incident management procedures, their effectiveness, and lessons learned. Debrief staff on any issues. Review and update Incident and Emergency Response Plan as appropriate.

Incident / Emergency Level Level and Incident Description	Positions Responsible for Actions and Contact Details	Investigation and Management Actions (Summary of Actions to be Taken)
Event with a high risk of causing illness and/or affecting a large number of customers, such as: • Detection of E. coli in the reticulation system • Exceedance of ADWG health guideline value for a chemical parameter (Fluoride) • Failure of infrastructure (severe or emergency level supply or supply disruption to over 50 customers for over 3 hours) through power outage, distribution line break, source pump failure etc. • An event that is likely to have resulted in the delivery of contaminated water to customers or where the delivery of contaminated water cannot be prevented e.g. backflow or back siphonage, flooding • Gross exceedance of ADWG health guideline values for a chemical parameter (value of exceedance is more than 5 times the ADWG health guideline limit).	Emergency Response Lead (EML) - Director of Engineering and Environmental Regulatory Services Phone: (07) 4746 7166 Mobile: 0427 470 009 Environmental & Regulatory Services Team Leader - Alternate Emergency Response Lead (AEML) Phone: (07) 4746 7166 Mobile: 0437 228 062 Water & Sewerage Officer Phone: 0429 464 004 Other Council Staff as required. External Agencies: • DRDMW • Queensland Health • Queensland Police • NATA Accredited Laboratory	• Report detection to DRDMW immediately by phone **(1300 596 709)** • Notify Council CEO • Commence investigation to determine cause • Arrange for re-samples to be taken where required • Isolate affected area (e.g. isolation valves, plugs, caps and seals and/or disengage supply pumps) • Review associated laboratory reports and operational records • Potential action and control; Arrange alternative water sources, issue boil water alerts • Notify critical customers as per requirements under the MSC Incident and Emergency Response Plan • Coordinate community messaging by placing information on Notice Boards, Council Website and Council Facebook page • Investigate causes of contamination • Instigate remediation as per Council's policies and procedures • Review emergency/incident management procedures, their effectiveness, and lessons learned. Debrief staff on any issues. Review and update Incident and Emergency Response Plan as appropriate. • Notify all users when water supply is safe / supply is resumed. • Review emergency/incident management procedures, their effectiveness, and lessons learned. Debrief staff on any issues. Review and update Incident and Emergency Response Plan as appropriate.
• Exceedance of ADWG aesthetic limit, for example turbidity, colour, Sodium levels or PH • Increased concentration of Total Coliforms	Emergency Response Lead (EML) - Director of Engineering and Environmental Regulatory Services Phone: (07) 4746 7166 Mobile: 0427 470 009 Environmental & Regulatory Services Team Leader - Alternate Emergency Response Lead (AEML) Phone: (07) 4746 7166 Mobile: 0437 228 062 Water & Sewerage Officer Phone: 0429 464 004 Other Council Staff as required. External Agencies: • NATA Accredited Laboratory	• Contact MSC internal management • Consider flushing and / or disinfecting the distribution pipes as per the Distribution System Maintenance Procedure • Consider organising repeat water quality sampling.

6 Risk Management Improvement

6.1 Risk Management Improvement Program

Councils Risk Management Improvement Program includes future capital works, identified corrections for current maintenance issues, recommendations from scheme review that was conducted by Dr Peter Mosse (PhD) in September 2018 that have not been able to be rectified immediately and identified water quality issues. Council acknowledges that it may have to address some identified hazards utilising a multi staged approach and these will be listed within Council's asset management and capital works programs. Some items will be displayed as examples in Table 6.1 below:

Table 6.1 - Risk Management Improvement Program

Risk Assessment Item No. (if applicable)	**Scheme component / sub-component**	**Hazard/ hazardous event**	**Priority**	**Action(s)**		**Target date/s**	**Estimated cost** (not required by OWSR but important for DWSP)	**Responsibility**
				short-term	**long-term**			
JC01, K01, M01, N01	Julia Creek, Kynuna, McKinlay and Nelia Bore Water	Bacteria and viruses in water / Contamination of water	High	*Quotes being sourced for replacement incubator/colilert tests and improvements to Julia Creek Laboratory by purchasing stainless steel bench tops, storage cupboards for storage of sample bottles and repairs to internal walls *Repairs to Hickman, Scour and Tower bore heads	Implement monthly/twice monthly/weekly Colilert sampling and additional sampling during any events in addition to laboratory samples	**Short-term** **Laboratory** March 2023 **Repairs** January 2023 **Long-term** April 2023	Approx. $10,000 for initial laboratory set up	Environmental & Regulatory Services Team Leader/Water and Sewerage Officer

Risk Assessment Item No. (if applicable)	Scheme component / sub-component	Hazard/ hazardous event	Priority	Action(s)		Target date/s	Estimated cost (not required by OWSR but important for DWSP)	Responsibility
				short-term	long-term			
JC04	Julia Creek Bore Water	Contamination / Loss of Supply	High	Install padlock on Lions Park Bore gate	Ensure compounds are secured at all times	**Short Term** End of December 2022 **Long Term** Ongoing	$500.00	Environmental & Regulatory Services Team Leader/WSO
JC10, K14, M13, N06	Julia Creek, Kynuna, McKinlay and Nelia Reticulation Network	Water Quality / Build-up of sediments and slimes	High	Establish Air Souring Program	Plan for Regular Air Scouring Program	**Short-term** April 2023 **Long-term** Ongoing	$50,000	Director of Engineering and Environmental Regulatory Services / Environmental & Regulatory Services Team Leader
JC11	Julia Creek Reticulation Network	Contamination / Aged or corroded infrastructure	High	Section replacements 1st section – Goldring Street	Full Replacement	**Short-term** End of June 2023 **Long-term** 2030	$100,000/annum	Director of Engineering and Environmental Regulatory Services

Risk Assessment Item No. (if applicable)	Scheme component / sub-component	Hazard/ hazardous event	Priority	Action(s)		Target date/s	Estimated cost (not required by OWSR but important for DWSP)	Responsibility
				short-term	long-term			
JC12	Julia Creek Reticulation Network	Contamination / Infiltration and ingress from backflow	Medium	Installed backflow connections to 100 properties	Capital Works Program for remaining household connections	**Short-term** Completed – March 2021 **Long-term** End of June 2023	$100,000	Director of Engineering and Environmental Regulatory Services
JC09, JC13, JC14, JC17, K13, K15, K16, K18, K21, M14, M16, M17, M20, N05, N07, N08, N09, N10, N12	Julia Creek, Kynuna, McKinlay and Nelia	Documentation / Operating Procedures	Medium	Development of new procedures for 'Sodium Hypochlorite Handling/Storage Procedure' and 'Water Tower Works Inspection Procedure' Update checklists to include additional inspection items including more detail on storage tanks and bore heads Amend 'Reservoir Integrity and Bore Head Maintenance Procedure' and 'Kynuna Treatment Plant Procedure' to reflect correct processes	Continue to review procedures annually and as required	**Short-term** January 2023 **Long-term** Ongoing		Environmental & Regulatory Services Team Leader / Water and Sewerage Officer

Risk Assessment Item No. (if applicable)	Scheme component / sub-component	Hazard/ hazardous event	Priority	Action(s)		Target date/s	Estimated cost (not required by OWSR but important for DWSP)	Responsibility
				short-term	long-term			
JC18, K22, M21, N13	Julia Creek, Kynuna, McKinlay and Nelia Regulatory Requirements	Training / Inadequately trained staff	Medium	Consider enrolling additional staff member in Certificate III in Water Industry Operations Course Additional training to be provided to Water Supply Staff in SWIMLocal Software, incident reporting, Kynuna Water Treatment Plant operation, and turbidity testing	Refresher training to be provided at least annually			
JC19, K23, M22, N14	Julia Creek, Kynuna, McKinlay and Nelia Bore Water	Opportunistic pathogens / Legionella and Naegleria	Medium	Prepare Fact Sheet in consultation with the Public Health Unit to issue to the community on ways to minimise exposure Organise for annual test of Naegleria	Continue to sample annually and update community as required	**Short Term** Testing for Naegleria to commence in December 2022 Preparation of Fact Sheet to be developed by January 2023 **Long Term** Ongoing	$600.00/annually for sampling requirements	Environmental & Regulatory Services Team Leader / Water and Sewerage Officer
K05	Kynuna Water Quality	Poor Water Quality / High iron and manganese levels	High	Cleaning and/or replacement of cartridge filters / Monitor monthly sample results	Replacement of media in IRS4000 filters every 2-3 years Replacement of riser pipe screen every 12 months Installation of additional Puretec filters, timed	**Short-term** Ongoing **Long-term Media** March 2024 **Riser pipe screen** March 2023 **Additional**	$6000/annum for purchase of media and riser pipe screen $25,000 for additional treatment options	Director of Engineering and Environmental Regulatory Services / Environmental & Regulatory Services Team Leader

Risk Assessment Item No. (if applicable)	Scheme component / sub-component	Hazard/ hazardous event	Priority	Action(s)		Target date/s	Estimated cost (not required by OWSR but important for DWSP)	Responsibility
				short-term	long-term			
					automated backwash system, decommissioning of disk filters, installation of new stainless steel pipe work, flow meters and new pressure meters Purchase hand-held turbidity meter and review turbidity limit in Verification Monitoring Program to align with ADWG and/or reputable water industry standards. Develop a turbidity target that aligns with the filtration system design	**treatment options** End June 2023 **Turbidity Meter** March 2023 **Review turbidity limits/set targets** June 2023 when new filtration unit comes online		
K07/M07	Kynuna and McKinlay Storage Tank	Bacteria and viruses in water / Contamination of Water	High	Obtain quotes from specialised tank cleaning contractors Update checklists to include more checks (condition of roof bolts, rivets, edging and hatches) Conduct inspections twice per month Replace existing mesh and install new mesh on overflow pipes to tanks at McKinlay	Implement Annual tank cleaning program	**Short-term** March 2023 **Long-term** December 2023		Environmental & Regulatory Services Team Leader/WSO

Risk Assessment Item No. (if applicable)	Scheme component / sub-component	Hazard/ hazardous event	Priority	Action(s)		Target date/s	Estimated cost (not required by OWSR but important for DWSP)	Responsibility
				short-term	long-term			
K08	Kynuna Storage Tank	Fall from Heights / Contamination of Water	High	Tender documents to be released to market for new stairs/platform at Kynuna	New Platform to be erected around high-level tank to enable proper visual and internal inspections	**Short-term** January 2023 **Long-term** End of June 2023	$50,000	Director of Engineering and Environmental Regulatory Services
M08	McKinlay Storage Tank	Fall from Heights / Contamination of Water	High	Engage structural engineer to assess and report on repairs to tin platform	New/Repaired platform	**Short-term** December 2022 **Long-term** July 2023		Director of Engineering and Environmental Regulatory Services/ Environmental & Regulatory Services Team Leader/WSO
NA	Julia Creek, Kynuna, McKinlay and Nelia	Asset Management	High	Tender documents released to market	Asset Management Plan developed	**Short-term** Completed **Long Term** End of June 2023	$147,500	Director of Engineering and Environmental Regulatory Services
NA	Kynuna and McKinlay	Removal of redundant equipment	Medium	Organise the removal of old standpipe at McKinlay and old pipework at Kynuna	Ensure facilities are tidy	**Short-term** January 2023 **Long Term** Ongoing		WSO
NA	All schemes	Radiological Testing	Medium	Contact QHSS to organise sampling of all bores	Annual sampling on all bores	**Short-term** January 2023 **Long Term** Ongoing		Environmental & Regulatory Services Team Leader

7 Service Wide Support - Information Management

7.1 Information Recording

Council staff report incidents; hazards; concerns; issues and complaints via Council's CRM system on H Drive / InfoXpert. Table 7.2 below shows the location and accountability for recording and storage of this information and data:

Table 7.2 - Information Management

Information / Documentation	Format	Location Stored	Position Responsible / Business Unit	Comments
Drinking Water Quality Complaints	InfoXpert / H Drive	Server	Environmental & Regulatory Services Department	The complaint log is updated when required by the Environmental & Regulatory Services Department.
Incident and Emergency Management	InfoXpert / H Drive	Server	Environmental & Regulatory Services Department	The file location can be found at: InfoXpert/User Workspace/Engineering/Water Supply
Maintenance logs	InfoXpert / H Drive	Server	Environmental & Regulatory Services Department	
Scheme history Data	InfoXpert / H Drive	Server	Environmental & Regulatory Services Department	All information relating to water supply can be found at: InfoXpert/User Workspace/Engineering/Water Supply
Maintenance Manuals, Information	InfoXpert / H Drive Hard Copies on relevant sites	Server Sites	Water & Sewerage Officer (WSO)	All electronic copies are kept on Council's server with hard copies on site where required
Annual Performance Report incl SWIM	InfoXpert / H Drive ERS Team Leader PC	Server	Environmental & Regulatory Services Department	SWIM is assessed via the ERS Team Leader's PC. All copies of the Annual Performance Reports are kept on Councils Server
Mains break (Operational Monitoring)	InfoXpert / H Drive	Server	Water & Sewerage Officer (WSO)	Details of Mains Breaks are identified in the compliant log.
Pressure Management (Operational Monitoring)	InfoXpert / H Drive	Server	Environmental & Regulatory Services Department	
Chemical Testing (Verification Monitoring)	InfoXpert / H Drive	Server	Environmental & Regulatory Services Department	Sampling results are collated into a spreadsheet and updated monthly
Bacteria Testing (Verification Monitoring)	InfoXpert / H Drive	Server	Environmental & Regulatory Services Department	All monitoring results are kept on Councils Server
Staff Training records	HR Files	Server	HR Officer	All training records are held on the staff files. These can be accessed if requested
Procedures	InfoXpert / H Drive	Server Hard Copies in WSO Vehicle	Environmental & Regulatory Services Department	

7.2 Record Retention Requirements

All documents related to the operation of the water supply are kept either electronically or by hardcopy.

It is Council's intention to maintain these documents for not only for the regulatory period but for the life of the scheme, to ensure ongoing knowledge is maintained. All documents maintained in a hardcopy format are kept as long as possible or transferred to electronic format and all electronic copies will be maintained on the server system indefinitely.

8 Operational and Verification Monitoring Programs

8.1 Operational Monitoring

Council undertakes daily inspections in Julia Creek and monthly in Kynuna, McKinlay and Nelia utilising available staff in each area of the network. Staff report incidents; hazards; concerns; issues and complaints via Council's CRM system on H Drive/InfoXpert. Responsible officers are involved in monthly quality testing, additional testing (where required) and remediation activities (where required) as outlined in Table 8.1 below:

Table 8.1 - Operational Monitoring

Activity	Source	Storage	Reticulation
Bore integrity (flow rate)	Record per visit		
Storage levels		Record as undertaken	
Storage integrity		As per procedure undertaken	
Town water consumption	Meter reading		
Leakage in system	Bore delivery pipework	Tank structure	Main breaks/water loss
Bacteria testing	Record as per testing frequency		Record as per testing frequency
Supply Pressure	Record monthly		Record monthly
Chemical testing	Record as per testing frequency		Record as per testing frequency
Aesthetics testing	Record as per testing frequency	As observed	Record as per testing frequency
Vandalism at sites	Record as observed	Record as observed	Record as observed
Mains Flushing activity			Record as undertaken
Customer advice on planned interruptions			Record when provided
Customer complaints and response			Record submitted and response (including time)

8.2 Verification Monitoring

The Verification Monitoring Program is displayed in Table 8.2 below. This program gives the characteristics of each water scheme to be monitored, periods of monitoring and actions to be performed if exceedances are recorded.

Council currently only takes a sample once per month at each scheme however are currently investigating into re-implementing Colilert testing in the Council laboratory. This is expected to be fully re-implemented in 2023.

Table 8.2 - Verification Monitoring

Parameter Type	Parameter	ADWG and/or regulation value	ADWG Value Type	Minimum Testing Frequency	Reticulation Scheme	Analysing Authority[#]	Response to Exceedances
Microbial	E.coli	Nil detect	Health	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Thermotolerant Coliforms	-	-	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
Physical	pH	Min 6.5 Max 8.5	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	TDS	600 mg/L	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Colour	15 HU	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Turbidity	5 NTU	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Aluminium	0.2 mg/L	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Silica	80 mg/L	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Boron	4 mg/L	Health	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
Inorganic	Ammonia	0.5 mg/L	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Iron	0.3 mg/L	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Manganese	0.5 mg/L	Health	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Sodium	180 mg/L	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Chloride	250 mg/L	Aesthetic	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Copper	2 mg/L	Health	Monthly	All	TLS	Refer to Incident and Emergency Response Plan
	Fluoride	1.5 mg/L	Health	Monthly	All	TLS	Refer to Incident and Emergency Response Plan

Parameter Type	Parameter	ADWG and/or regulation value	ADWG Value Type	Minimum Testing Frequency	Reticulation Scheme	Analysing Authority[#]	Response to Exceedances
Bore integrity	Bore logging	-	-	10 year	All	RDMW or Authorised Bore Logger	Refer to Reservoir Integrity and Bore Head Maintenance Procedure
Storage	Tank Inspections	-	-	Monthly *Council is considering inspecting twice per month	All except Nelia	MSC	Refer to Reservoir Integrity and Bore Head Maintenance Procedure
Storage	Balance tank structural inspection	-	-	5-10 year	Julia Creek	MSC	Refer to Reservoir Integrity and Bore Head Maintenance Procedure
Reticulation	Pipe Network	-	-	3 Monthly	All	MSC	Refer to Distribution System Maintenance Procedure
Power supply	Generator Check	-	-	3 Monthly	All	MSC	As per the Generator Checklist
Customer Complaints	Complaint data	-	-	Review all data via monthly reports	All	MSC	Refer to Monitoring Customer Complaints Procedure
Radiological testing	Water Quality	-	-	Annually	All	QHFSS	

 # Note 1: TLS-Townsville Laboratory Services, MSC-McKinlay Shire Council, RDMW-Dept Regional Development, Manufacturing and Water

A location of sampling points is provided in Appendix E of this management plan. Samples located at the bores in Kynuna and McKinlay are to monitor the consistency of source of supply only. Reticulation locations have been established for some time and these points represent a convenient access location and would generally be representative of the quality of the water across the town. Samples taken at Julia Creek get alternated between 3 different locations.

9 Best Practice Recommendations

Given the location of McKinlay Shire in Western Queensland and the size of its population, the implementation of "Best Practice" may be a misleading concept. The activities to deliver an appropriate standard of service at an affordable price is the driving force for Council. That is not to say the adoption of improved practices in operations and the introduction of improved infrastructure and technology is a goal for Council. Opportunities for State and Federal Government grants is also acknowledged by Council however, the aim to achieve financial sustainable is also a desire.

The success of grants that result in a substantial asset base on top of the current asset values may simply add an unaffordable depreciation expense to the water schemes financial capability. Therefore Council has traditionally balanced the needs and expectation of the service for the community to the financial capability while focusing on the safety of the drinking water supply as detailed in the sections below.

9.1 Commitment to Drinking Water Quality Management

Council adopted a Policy on Drinking Water Quality in November 2019 (refer Appendix F of this management plan) and it is due for revision in April 2022. Intent of the policy is "T*o establish a policy for the implementation and maintenance of the McKinlay Shire Council's potable water supplies, that complies with the relevant legislation and standards and protects the public's health".* This policy statement commits Council to the implementation and maintenance of the drinking water management system which reflects the ADWG, while preserving and protecting the health of the community.

The policy further acknowledges that *"McKinlay Shire Council (MSC) is bound by the requirements within the Water Supply (Safety and Reliability) Act 2008 and the Public Health Act 2005 to provide potable water to all consumers within the MSC water supply declared service areas".* As a consequence, Council has adopted a set of Customer Service Standards (refer Appendix G of this management plan). These service standards identify the availability of service and network conditions. Importantly, service standards inform both the community and the organisation as to how both parties of the supply arrangements will engage.

The Great Artesian Basin water source is managed by the Department of Natural Resources and are required to be licenced as bores under the *Water Act 2000*. Copies of bore licences are attached in Appendix A of this management plan. Any work on the bores is required to be undertaken in accordance with a bore management statement as required by the Department.

Council Policy acknowledges the following list of regulatory requirements in the management and delivery of drinking water to its community.

- Local Government Act 2009
- Local Government Regulation 2012
- Water Act 2000
- Water Supply (Safety and Reliability) Act 2008
- Water Fluoridation Act 2008
- Plumbing and Drainage Act 2018
- Plumbing and Drainage Regulation 2019
- Public Health Act 2005
- Public Health Regulation 2018
- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2011

The Policy Statement reinforces Council's commitment to its legislative compliance. Review of the policy in 2022 will consider the inclusion of this DWQMP as the focus of Council's commitment to the delivery of its drinking water service.

9.2 Employee Awareness and Training

As identified in Section 3 of this management plan, employees engaged in the drinking water supply is extremely limited in numbers and that places significant burden on these employees to undertake the day-to-day operations as well as the broader needs of the drinking water service delivery. Management and Operational staff maintain their awareness as to regulatory requirements and operational demands through industry training.

Training needs for individual staff members are developed at the annual performance interviews. Training and development of Council staff is undertaken in accordance with Council's Employee Professional Development and Training Policy.

9.3 Research and Development

Council has acknowledged in its Drinking Water Quality Policy (November 2019) that Council will participate in research and development, however limitations on resourcing many not necessarily achieve an expected participation rate. Funding new technology and systems may not be easily achieved regardless of the positive intentions of Council and employees.

9.4 Review and Continual Improvement

Council will undertake the review of the DWQMP in accordance with the Guidelines. Although Council has no formal continuous improvement program, staff acknowledge that continuous improvement is part of their work culture and identify improvements to processes and practices in order to provide a more efficient and effective service to the community.

Outcomes of the formal review process will be utilised to develop a budget program to deliver any improvements identified. Council has in the past acknowledged improvement recommendations provided by the *Dr Peter Mosse Report* and has made a concerted effort to deliver on these improvements. The outcomes that could not be addressed immediately are outlined in the Risk Management Improvement Program

Appendix A – Bore Licenses

Julia Creek Town Supply

WATER LICENCE
Water Act 2000

Queensland Government

Reference	403971	**Expiry Date**	31/07/2012
Licensee	MCKINLAY SHIRE COUNCIL		
Authorised Activity	The taking of underground water from GILBERT RIVER FORMATION with the point of take under Lot 3 on EN836008, Lot 16 on EN34, Lot 39 on EN101, Lot 28 on JC55710 and Lot 543 on SP107200. To supply the township of Julia Creek.		
Authorised Purpose	Town Water Supply		
Nominal Entitlement	675 Megalitres		

This water licence is subject to the conditions endorsed hereon or attached hereto.

Under the *Integrated Planning Act 1997* a development permit may be required for operational works to take or interfere with the water described in this licence. The licensee must ensure that the relevant development approvals have been obtained prior to installing or constructing new or additional operational works.

Given at Longreach this ELEVENTH day of AUGUST 2009.

John Bradley
Director-General
Department of Environment and Resource Management

Water Licence: 403971
Expiry Date: 31/07/2012

Conditions: Schedule A

6.31
The water taken under this water licence must be reticulated by pipeline to tanks and troughs. The use of a bore drain or a system of bore drains to distribute any of the water taken is not permitted.

McKinlay Town Supply

WATER LICENCE

Water Act 2000

Queensland Government
Natural Resources and Water

Reference	403973	**Expiry Date**	31/07/2012
Licensee	MCKINLAY SHIRE COUNCIL		
Authorised Activity	The taking of underground water from FLINDERS 2 MANAGEMENT UNIT (GREAT ARTESIAN BASIN) under land described as Lot 21 on AL74. To supply the township of McKinlay.		
Authorised Purpose	Town Water Supply		
Nominal Entitlement	150 megalitres per water year		

This water licence is subject to the conditions endorsed hereon or attached hereto.

Under the *Integrated Planning Act 1997* a development permit may be required for operational works to take or interfere with the water described in this licence. The licensee must ensure that the relevant development approvals have been obtained prior to installing or constructing new or additional operational works.

Given at Longreach this FOURTEENTH day of AUGUST 2007.

Scott Spencer
DIRECTOR-GENERAL
DEPARTMENT OF NATURAL RESOURCES AND WATER

Water Licence 403973

Expiry Date 31/07/2012

Queensland Government
Natural Resources and Water

Conditions: Schedule A

1.01
The licensee must notify the chief executive of any new or additional works through which water under this water licence is to be taken, prior to taking the water from these new or additional works. The notification must be given in writing and if the new or additional works require development approval, this notification must include details of the relevant development permit(s).

1.10
A water year shall be from 1st July to 30th June.

6.30
The water taken under the authority of this water licence must be reticulated by pipeline to tanks and troughs. The use of a bore drain or a system of bore drains to distribute any of the water taken is not permitted.

Kynuna Town Supply

WATER LICENCE

Water Act 2000

Queensland Government
Natural Resources and Water

Reference	403972	**Expiry Date**	31/07/2012
Licensee	MCKINLAY SHIRE COUNCIL		
Authorised Activity	The taking of underground water from FLINDERS 4 MANAGEMENT UNIT (GREAT ARTESIAN BASIN) under land described as Lot 1 on K3718. To supply the township of Kynuna.		
Authorised Purpose	Town Water Supply		
Nominal Entitlement	100 megalitres per water year		

This water licence is subject to the conditions endorsed hereon or attached hereto.

Under the *Integrated Planning Act 1997* a development permit may be required for operational works to take or interfere with the water described in this licence. The licensee must ensure that the relevant development approvals have been obtained prior to installing or constructing new or additional operational works.

Given at Longreach this FOURTEENTH day of AUGUST 2007.

Scott Spencer
DIRECTOR-GENERAL
DEPARTMENT OF NATURAL RESOURCES AND WATER

Water Licence 403972

Expiry Date 31/07/2012

Queensland Government
Natural Resources and Water

Conditions: Schedule A

1.01
The licensee must notify the chief executive of any new or additional works through which water under this water licence is to be taken, prior to taking the water from these new or additional works. The notification must be given in writing and if the new or additional works require development approval, this notification must include details of the relevant development permit(s).

1.10
A water year shall be from 1st July to 30th June.

6.30
The water taken under the authority of this water licence must be reticulated by pipeline to tanks and troughs. The use of a bore drain or a system of bore drains to distribute any of the water taken is not permitted.

Nelia Town Supply

WATER LICENCE
Water Act 2000

Queensland Government

Reference	606552	**Expiry Date**	31/03/2017
Licensee	MCKINLAY SHIRE COUNCIL		
Authorised Activity	The taking of underground water from the Flinders 3 Management Unit (Great Artesian Basin) with the point of take under Lot 303 on N6314. Located on adjacent road reserve.		
Authorised Purpose	Domestic Supply and Stock		

This water licence is subject to the conditions endorsed hereon or attached hereto.

Under the *Sustainable Planning Act 2009* a development permit may be required for operational works to take or interfere with the water described in this licence. The licensee must ensure that the relevant development approvals have been obtained prior to installing or constructing new or additional operational works.

Given at Longreach this SIXTEENTH day of MARCH 2012.

Jim Reeves
Director-General
Department of Environment and Resource Management

Queensland Government

Conditions: Schedule A

6.31
The water taken under this water licence must be reticulated by pipeline to tanks and troughs. The use of a bore drain or a system of bore drains to distribute any of the water taken is not permitted.

Appendix B – Fluoride Fact Sheet

Naturally occurring fluoride in Julia Creek's drinking water

Fluoride is a natural element often found in water, plants, rocks, soil, air and some foods. Research shows that fluoride helps protect teeth against tooth decay. Regularly drinking water containing fluoride levels recommended by the Australian Drinking Water Guidelines can help reduce tooth decay for people of all ages.

What is the drinking water standard for fluoride?

The Australian Drinking Water Guidelines recommend an upper limit of 1.5 milligrams per litre (or parts per million) of fluoride in drinking water. This is equivalent to one twentieth of a teaspoon of fluoride in a bathtub of water.

Many Western Queensland towns source their drinking water from groundwater (i.e. bores).These water sources can contain natural fluoride levels that are above this limit if rock formations are fluoride-rich.

McKinlay Shire Council advises that Julia Creek's drinking water supply contain about 3 milligrams per litre of naturally occurring fluoride. This is considerably higher than the recommended limit in the Guidelines.

Conventional water treatment processes and most domestic water filters do not reduce the level of fluoride present in your drinking water.

What are the risks of elevated levels of fluoride in drinking water?

There are two side effects that have been associated with elevated levels of fluoride in drinking water. The first is dental fluorosis and the second is skeletal fluorosis, which only occurs with very high levels of fluoride in drinking water.

What is dental fluorosis?

The main side effect associated with elevated levels of fluoride in drinking water is a condition known as dental fluorosis.

Dental fluorosis is largely an aesthetic concern and most often occurs as a mild change to the appearance of tooth enamel. It can appear as small, almost invisible, white lines in the enamel. More rarely, and in more severe cases, it can appear as pitting or staining of the enamel

Dental fluorosis can also occur if too much fluoride is ingested when teeth are developing at around one to four years of age.

The risk of developing dental fluorosis, or experiencing more severe forms of the condition, increases with greater levels of fluoride in drinking water. However occasionally dental fluorosis occurs in developing teeth at relatively low fluoride levels.

Showering or bathing in water containing high levels of fluoride does not increase the risk of developing dental fluorosis.

What is skeletal fluorosis?

Skeletal fluorosis only occurs with very high levels of fluoride in drinking water. The degree or severity of the condition depends on the level of fluoride present.

Skeletal fluorosis takes many years to develop and can affect ligaments and bones. Mild forms of the condition may not present any symptoms; however more severe cases may cause joint pain and stiffness.

The most severe form of skeletal fluorosis (i.e. crippling fluorosis) is usually only associated with the consumption of water containing more than 10 milligrams of fluoride per litre (two to three times the level in Julia Creek's drinking water supply) but regular consumption of water with fluoride concentrations above about 4 mg/:L involves progressively increasing risks of skeletal fluorosis.

What can I do to minimise the risk of dental and skeletal fluorosis?

Most domestic water filters do not reduce the level of fluoride present in your drinking water. Parents can reduce the risk of children developing dental fluorosis by ensuring children do not take fluoride supplements (e.g. fluoride tablets and/or drops) and cleaning children's teeth with low fluoride or fluoride free toothpaste until the age of 18 month, unless otherwise recommended by a dentist. If fluoridated toothpaste is used, ensuring only a pea-sized amount of toothpaste is used and that children spit out after brushing and rinse their mouths with water. Monitoring and restricting other sources of fluoride in their children's diet (such as non-herbal tea and most seafood). Providing bottled drinking water where possible, but do not substitute bottled drinking water with soft drinks or other drinks high in sugar.

- Breast-feeding infants where possible and using bottled water to add to infant formula; and
- As people with kidney impairment have a lower margin of safety for fluoride intake, it would be encouraged that bottled water be had as an alternative.

How can I reduce the level of fluoride in my water?

Residents who are concerned with the high levels of fluoride occurring naturally in the Julia Creek supply network can reduce fluoride within their drinking water by using a point of use cartridge filter in their homes. Certain filters can provide fluoride reduction if specifically designed for this. Please contact the McKinlay Shire Council for further information on appropriate fluoride reducing filters available.

Help and assistance

For general enquiries contact your local Public Health Unit:

• Townsville Phone: 4433 6900

For more information:

• Contact your dental professional
• Visit www.health.qld.gov.au/oralhealth
• Call 13 HEALTH (13 43 25 84) for confidential health advice 24 hours a day, seven days a week
• Email oral_health@health.qld.gov.au

• Contact McKinlay Shire Council
• Visit http://www.mckinlay.qld.gov.au
• Call (07) 4746 7166
• Email reception@mckinlay.qld.gov.au

The information in this fact sheet applies only to Julia Creek. It does not apply to locations with standard levels of water fluoridation.

Appendix C- Water Monitoring Data

pH

Aesthetic Level - Min 6.5 - Max 8.5

Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	6.91	7.01	6.92	8.41	NA	6.99	6.97	Only 1 sample taken at McKinlay
Aug 17	7.61	6.91	7.44	**8.97**	NA	7.01	7.03	Only 1 sample taken at McKinlay
Sept 17	6.95	6.88	6.98	**8.55**	NA	7.25	6.97	Only 1 sample taken at McKinlay
Oct 17	6.79	7.34	7.52	**8.53**	NA	7.98	7.87	Only 1 sample taken at McKinlay
Nov 17	7.5	7.78	7.86	8.48	NA	7.72	7.79	Only 1 sample taken at McKinlay
Dec 17	7.68	7.59	7.78	**8.65**	NA	7.76	7.84	Only 1 sample taken at McKinlay
Jan 18	7.66	7.62	7.64	**8.5**	8.32	7.95	7.96	
Feb 18	7.53	7.91	7.7	**8.52**	8.33	7.8	7.9	
Mar 18	7.63	7.71	7.64	**8.96**	8.35	7.91	7.81	
Apr 18	7.23	7.26	7.29	**8.50**	8.30	7.74	7.61	
May 18	7.60	7.13	7.76	**8.68**	**8.64**	8.13	7.95	
Jun 18	7.61	7.71	7.83	**8.58**	8.48	7.99	8.05	
Jul 18	7.81	7.91	7.70	**8.52**	8.09	7.91	7.85	
Aug 18	7.57	7.67	7.92	**8.67**	**8.51**	7.53	8.26	
Sept 18	7.57	7.82	7.67	**8.55**	**8.53**	8.01	7.90	
Oct 18	7.76	7.88	7.81	**8.65**	**8.51**	7.95	7.83	
Nov 18	7.75	7.92	7.64	8.45	8.28	7.90	7.82	
Dec 18	7.57	7.55	7.66	**8.52**	8.29	7.89	0	
Jan 19	7.88	7.79	7.74	**8.63**	8.36	7.90	7.87	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	7.75	7.75	7.59	**8.56**	8.4	8.05	7.81	
Apr 19	7.77	7.76	7.58	**8.55**	8.05	7.86	7.79	
May 19	7.33	7.87	7.82	**8.52**	8.46	7.93	7.7	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	7.56	8.03	7.69	**8.52**	8.34	7.86	7.81	
Aug 19	7.54	7.66	7.69	**8.54**	8.29	7.62	7.76	
Sept 19	7.53	7.83	7.81	**8.55**	8.26	7.94	7.80	
Oct 19	7.44	7.9	7.6	**8.56**	8.39	8.01	7.87	
Nov 19	7.98	7.95	7.77	**8.61**	8.11	7.98	8	
Dec 19	7.64	8.13	7.77	**8.55**	8.33	8.06	7.78	
Jan 20	7.61	7.75	7.72	**8.61**	8.35	8.04	7.86	
Feb 20	7.55	7.98	7.82	**8.53**	7.97	7.88	7.77	
Mar 20	7.78	7.97	7.9	**8.6**	8.29	8.17	7.84	
Apr 20	7.6	7.69	7.79	**8.52**	8.50	8.17	8.05	
May 20	7.51	7.63	7.73	8.45	8.33	7.91	7.78	
Jun 20	7.65	7.71	7.72	**8.65**	**8.54**	7.97	7.84	
Jul 20	7.56	7.48	7.63	8.46	8.36	7.96	7.88	
Aug 20	7.48	7.82	7.75	8.47	8.48	7.95	8.03	
Sept 20	7.47	7.93	7.74	**8.58**	8.43	7.94	7.83	
Oct 20	7.79	8	7.94	**8.63**	8.48	8.19	7.91	
Nov 20	7.67	7.75	7.72	**8.52**	8.45	7.88	7.8	
Dec 20	7.59	7.68	7.53	**8.52**	8.44	8.05	7.96	
Jan 21	7.71	7.93	7.57	8.32	8.17	7.83	7.8	
Feb 21	7.36	7.42	7.75	8.3	8.26	7.78	7.75	
Mar 21	7.51	7.41	7.43	8.45	8.37	***8.02**	7.71	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	7.5	7.74	7.38	8.37	8.40	7.9	7.92	

Jun 21	7.54	7.66	7.48	8.43	8.3	7.8	7.82	
Jul 21	7.54	7.78	7.79	**8.52**	8.5	8.1	7.95	
Aug 21	7.81	7.48	7.53	8.24	8.08	7.72	7.73	
Sept 21	7.42	7.93	7.63	8.43	8.22	7.99	7.74	
Oct 21	7.36	7.82	7.35	8.32	8.13	7.73	7.61	
Nov 21	7.53	7.93	7.69	8.41	8.29	7.81	7.78	
Dec 21	7.32	7.92	7.63	8.49	8.2	***7.73**	7.72	***Sample taken at Lions Park**
Jan 22	7.48	8.08	7.94	8.41	8.36	7.99	7.84	
Feb 22	7.44	7.61	8.00	8.34	8.18	***7.73**	7.68	***Sample taken at Racecourse**

Turbidity								
Aesthetic Level - 5								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.5	2.5	**49.8**	0.9	NA	**24.1**	0.5	Only 1 sample taken at McKinlay
Aug 17	0.4	**7.1**	**9.2**	1.3	NA	0.2	0.3	Only 1 sample taken at McKinlay
Sept 17	0.4	**7.3**	**18**	0.8	NA	0.3	0.2	Only 1 sample taken at McKinlay
Oct 17	0.5	2.2	**8**	0.8	NA	0.4	0.5	Only 1 sample taken at McKinlay
Nov 17	0.5	1.3	**18.8**	1	NA	**6.3**	0.5	Only 1 sample taken at McKinlay
Dec 17	0.9	3.4	0.5	1	NA	0.5	0.4	Only 1 sample taken at McKinlay
Jan 18	0.6	6	**19.9**	1.4	0.8	2.6	0.8	
Feb 18	0.5	**15.1**	**19.5**	0.8	0.8	0.5	0.4	
Mar 18	0.5	**12.0**	**55.9**	0.8	0.7	**28.1**	2.4	
Apr 18	0.4	**9.5**	**30.1**	1.2	1.0	**30.5**	0.9	
May 18	0.3	4.4	**25.5**	1.1	0.8	0.3	0.3	
Jun 18	0.5	3.6	**28.3**	1.6	1.0	0.4	0.4	
Jul 18	1.4	2.3	2.5	1.9	1.2	0.6	0.2	
Aug 18	1.6	5.8	**28.4**	1.4	1.2	0.5	0.6	
Sept 18	0.3	3.3	**19.7**	0.8	0.4	0.4	0.4	
Oct 18	0.6	**5.7**	**58.9**	2.2	0.8	2.2	0.3	
Nov 18	0.3	3.6	**41.0**	2.5	2.1	0.5	0.7	
Dec 18	0.4	**5.2**	**78.4**	1.1	1.7	0.3	0	
Jan 19	0.4	**6.5**	**112**	1.0	1.9	0.5	1.0	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	1.3	**8.6**	**34.3**	0.8	1	1.2	0.4	
Apr 19	1.9	3.5	**33.6**	1.0	1.9	0.3	0.3	
May 19	0.2	**6.5**	**36.6**	0.8	0.5	0.5	0.3	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	0.6	**11.4**	**18.5**	0.8	0.5	0.99	0.3	
Aug 19	0.3	**17.9**	**191**	0.5	0.3	0.9	0.9	
Sept 19	0.5	3.8	**105**	0.7	0.3	0.4	0.3	
Oct 19	0.6	**5.1**	**3.1**	0.7	0.7	0.5	0.2	
Nov 19	0.4	**7.4**	**49.7**	0.7	0.3	0.3	0.1	
Dec 19	0.6	2.1	**134**	0.9	0.9	0.6	0.4	
Jan 20	0.8	3.3	**442**	1.0	1.5	0.5	0.5	
Feb 20	0.8	**5.2**	**798**	1	0.6	0.5	0.2	
Mar 20	0.6	2.4	**81.3**	0.5	0.5	0.3	0.9	
Apr 20	0.6	**9.6**	**28.8**	0.7	0.6	0.5	0.6	
May 20	0.6	**17.1**	**29**	0.6	0.3	0.3	1.1	
Jun 20	0.8	**5.9**	**27.2**	0.6	0.3	0.5	0.5	
Jul 20	0.8	**9.2**	**82.9**	1.1	0.3	0.4	0.3	
Aug 20	0.4	**12.7**	**122**	1.1	5.4	0.3	0.3	
Sept 20	1.2	**10.9**	**148**	1.4	0.4	0.9	0.2	
Oct 20	0.9	**9.1**	**131**	1.1	1.2	0.5	0.5	
Nov 20	0.3	**9**	**190.0**	1.4	0.6	0.3	0.8	
Dec 20	0.7	**7.5**	3.8	0.5	0.6	0.4	0.3	
Jan 21	2.5	**8.2**	**866**	1.2	0.6	0.8	0.5	
Feb 21	0.3	**20.1**	**35.1**	2.7	**5.5**	0.8	1	
Mar 21	0.7	**11.3**	**142**	1.8	**10.6**	***0.4**	0.4	***Sample taken at Racecourse**
Apr 21	0.0	**0**	**0**	0.0	0.0	0	0	No sampling undertaken
May 21	0.9	**5.5**	**18.6**	0.8	0.6	0.5	0.5	

Jun 21	0.6	**10.5**	**6.7**	0.5	0.5	0.3	0.4	
Jul 21	0.4	**14.3**	**68.7**	1	0.6	0.6	0.9	
Aug 21	0.4	**8.6**	**56.1**	0.8	0.3	0.5	0.3	
Sept 21	0.5	**10.9**	**25.8**	0.5	0.4	0.9	0.8	
Oct 21	0.4	**8.8**	**7**	0.2	0.2	0.2	0.3	
Nov 21	2.7	**12.6**	**487.0**	0.6	0.8	0.5	0.4	
Dec 21	0.4	**6.7**	**79.3**	0.5	0.6	***0.6**	0.2	***Sample taken at Lions Park**
Jan 22	3	**10.3**	**61.9**	2.3	0.6	3.2	0.4	
Feb 22	0.7	**94.4**	**5.2**	1.1	0.6	***0.6**	0.4	***Sample taken at Racecourse**

True Colour								
Aesthetic Level - 15								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	1	<1	1	2	NA	1	<1	Only 1 sample taken at McKinlay
Aug 17	<1	1	1	1	NA	<1	<	Only 1 sample taken at McKinlay
Sept 17	<1	2	3	1	NA	<1	<1	Only 1 sample taken at McKinlay
Oct 17	<1	1	9	2	NA	<1	<1	Only 1 sample taken at McKinlay
Nov 17	<1	6	9	3	NA	4	1	Only 1 sample taken at McKinlay
Dec 17	<1	<1	3	2	NA	<1	<1	Only 1 sample taken at McKinlay
Jan 18	<1	<1	1	<1	1	<1	<1	
Feb 18	<1	1	5	4	<1	<1	2	
Mar 18	<1	1	1	<1	<1	1	<1	
Apr 18	<1	5	8	3	2	3	<1	
May 18	<1	4	11	7	6	1	1	
Jun 18	<1	2	5	2	2	2	1	
Jul 18	<1	2	3	2	3	2	1	
Aug 18	<1	4	6	1	4	>1	1	
Sept 18	<1	2	4	4	2	1	<1	
Oct 18	<1	5	9	3	2	1	1	
Nov 18	<1	7	10	9	9	7	7	
Dec 18	<1	5	1	1	1	1	0	
Jan 19	<1	3	7	1	1	1	1	

Feb 19	<1	0	0	0	0	0	0	No sampling undertaken
Mar 19	<1	7	8	2	5	6	3	
Apr 19	<1	2	5	2	<1	1	1	
May 19	8	1	4	<1	<1	<1	<1	
Jun 19	7	0	0	0	0	0	0	No sampling undertaken
Jul 19	4	8	9	3	1	<1	1	
Aug 19	4	10	11	2	<1	<1	2	
Sept 19	4	1	6	2	<1	<1	<1	
Oct 19	3	<1	8	<1	<1	<1	<1	
Nov 19	3	2	6	<1	<1	<1	<1	
Dec 19	2	3	9	3	2	<1	<1	
Jan 20	2	7	**20**	5	5	1	1	
Feb 20	2	11	**43**	3	2	2	3	
Mar 20	2	1	**19**	<1	<1	<1	<1	
Apr 20	2	5	12	2	2	6	2	
May 20	2	10	9	1	2	3	2	
Jun 20	2	<1	4	<1	<1	<1	<1	
Jul 20	1	5	8	<1	<1	<1	<1	
Aug 20	1	6	**56**	5	2	2	4	
Sept 20	1	3	6	<1	<1	<1	1	
Oct 20	1	4	6	2	<1	1	2	
Nov 20	1	4	14	1	1	3	8	
Dec 20	1	6	**15**	1	<1	2	4	
Jan 21	1	2	**32**	1	<1	1	<1	
Feb 21	1	3	6	2	1	2	9	
Mar 21	1	4	8	<1	<1	***<1**	1	***Sample taken at Racecourse**
Apr 21	1	0	0	0	0	0	0	No sampling undertaken
May 21	1	3	3	<1	2	1	<1	

Jun 21	1	7	**32**	1	2	2	3	
Jul 21	1	3	**18**	<1	<1	<1	<1	
Aug 21	1	3	**20**	4	1	2	1	
Sept 21	1	4	2	<1	<1	<1	<1	
Oct 21	1	3	11	<1	<1	4	<1	
Nov 21	1	8	15.0	1	2	1	1	
Dec 21	0	7	10	<1	1	***4**	1	***Sample taken at Lions Park**
Jan 22	0	7	**27**	3.0	2	1	2.0	
Feb 22	0	**15**	1	<1	<1	***<1**	1	***Sample taken at Racecourse**

Sodium Na+								
Aesthetic Level: 180								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	74.7	103	106	242	NA	130	131	Only 1 sample taken at McKinlay
Aug 17	64.2	99.4	98.2	207	NA	123	113	Only 1 sample taken at McKinlay
Sept 17	74.9	98.1	103	227	NA	127	128	Only 1 sample taken at McKinlay
Oct 17	72.1	99.7	110	221	NA	126	125	Only 1 sample taken at McKinlay
Nov 17	74	119	125	227	NA	135	127	Only 1 sample taken at McKinlay
Dec 17	73.2	102	108	227	NA	130	136	Only 1 sample taken at McKinlay
Jan 18	74.9	95.8	97.3	221	214	122	124	
Feb 18	79.8	115	115	235	228	126	139	
Mar 18	69.8	99.6	96.4	222	212	115	83.8	
Apr 18	72.9	103	107	232	233	124	130	
May 18	76.8	109	103	229	227	141	136	
Jun 18	78.6	103	101	221	229	132	128	
Jul 18	69.9	145	155	216	227	124	118	
Aug 18	65.8	89.6	95.2	201	220	116	107	
Sept 18	61.2	92.1	87.0	198	195	104	117	
Oct 18	72.4	102	88.4	226	228	126	131	
Nov 18	70.8	97.9	99.0	226	221	124	123	
Dec 18	70.7	97.1	103	205	213	113	0	
Jan 19	75.0	111	110	227	219	135	139	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	66.8	92.5	91.2	**191**	**207**	111	117	
Apr 19	67.5	90.3	90.7	**204**	**198**	120	116	
May 19	75.2	102	106	**223**	**223**	131	129	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	70.5	101	99.3	**225**	**227**	128	129	
Aug 19	63.9	85.1	88.4	**191**	**196**	109	110	
Sept 19	66	86.3	92.0	**198**	**183**	118	113	
Oct 19	63.8	93.7	96.8	**208**	**218**	117	121	
Nov 19	71.1	98.2	99.6	**213**	**215**	134	124	
Dec 19	70.6	101	99	**214**	**214**	120	120	
Jan 20	59.0	79.1	81.7	175	157	96.9	95.1	
Feb 20	62.2	102	112	**198**	**199**	126	119	
Mar 20	63.6	91.7	103	**230**	**222**	108	110	
Apr 20	62.1	87.7	93	**202**	**206**	118	116	
May 20	67.2	97.6	95.8	**198**	**215**	125	116	
Jun 20	55.5	81.7	82.8	**185**	174	109	107	
Jul 20	59.9	90.8	95.1	**211**	**208**	118	119	
Aug 20	67.3	95.3	92.5	**226**	**196**	118	115	
Sept 20	57	79.3	78.6	**181**	**182**	99.9	91.2	
Oct 20	76.7	106	103	**245**	**248**	145	131	
Nov 20	50	67.2	65.6	161	148	87.9	86.9	
Dec 20	61.7	85.9	84.5	**197**	**199**	107	106	
Jan 21	61.2	92	91.5	**191**	**197**	105	103	
Feb 21	62.8	86.7	85.6	**192**	**181**	111	106	
Mar 21	57.8	80.5	79.9	**181**	**186**	***102**	104	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	52.1	71.4	69.1	160	158	87.9	85.5	

Jun 21	43.4	61	61.5	137	140	76.6	72.9	
Jul 21	47.1	66.6	65	148	144	82.5	82.3	
Aug 21	59	85.3	80.7	**186**	179	105	103	
Sept 21	69.3	91.8	90.5	**209**	**224**	122	113	
Oct 21	73.8	105	106	**226**	**237**	136	143	
Nov 21	54.1	75.7	82.4	**190**	175	88.4	90.2	
Dec 21	70.2	98.2	96.6	**218**	**227**	***124**	126	***Sample taken at Lions Park**
Jan 22	70.8	98.6	97.6	**223**	**222**	136	121	
Feb 22	66.8	91.2	98.6	**204**	**212**	***117**	119	***Sample taken at Racecourse**

Aluminium Al								
Aesthetic Level: 0.2								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	<0.005	<0.005	0.01	0.013	NA	0.04	<0.005	Only 1 sample taken at McKinlay
Aug 17	<0.005	<0.005	<0.005	0.048	NA	<0.005	<0.005	Only 1 sample taken at McKinlay
Sept 17	<0.005	0.006	0.008	0.012	NA	0.008	<0.005	Only 1 sample taken at McKinlay
Oct 17	<0.005	0.073	<0.005	<0.005	NA	<0.005	<0.005	Only 1 sample taken at McKinlay
Nov 17	<0.005	0.009	0.007	0.013	NA	0.035	<0.005	Only 1 sample taken at McKinlay
Dec 17	<0.005	<0.005	0.01	0.009	NA	0.061	<0.005	Only 1 sample taken at McKinlay
Jan 18	<0.005	<0.005	<0.005	<0.005	0.005	0.007	<0.005	
Feb 18	<0.005	0.009	<0.005	0.008	0.011	<0.005	<0.005	
Mar 18	<0.005	0.006	0.005	0.011	0.009	0.081	0.076	
Apr 18	<0.005	<0.005	<0.005	0.012	0.01	0.154	<0.005	
May 18	<0.005	0.008	<0.005	0.024	0.011	<0.005	<0.005	
Jun 18	<0.005	<0.005	<0.005	0.014	0.013	<0.005	<0.005	
Jul 18	<0.005	<0.005	<0.005	0.010	0.009	<0.005	<0.005	
Aug 18	<0.005	0.007	<0.005	0.01	0.013	<0.005	<0.005	
Sept 18	<0.005	0.005	<0.005	0.008	0.01	<0.005	<0.005	
Oct 18	0.005	0.017	<0.005	0.010	0.009	0.006	0.008	
Nov 18	<0.010	<0.010	<0.010	<0.010	0.051	0.012	<0.010	
Dec 18	<0.010	<0.010	<0.010	<0.010	0.112	<0.010		
Jan 19	<0.010	<0.010	0.016	<0.010	0.131	<0.010	<0.010	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Apr 19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
May 19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	<0.010	<0.010	<0.010	0.016	0.013	<0.010	<0.010	
Aug 19	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	<0.010	
Sept 19	<0.010	<0.010	0.016	0.019	<0.010	<0.010	<0.010	
Oct 19	<0.010	<0.010	0.025	<0.010	<0.010	<0.010	<0.010	
Nov 19	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Dec 19	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	
Jan 20	<0.010	<0.010	0.063	<0.010	<0.010	<0.010	<0.010	
Feb 20	<0.010	<0.010	<2	0.02	0.013	<0.010	<0.010	
Mar 20	<0.010	<0.010	0.053	0.031	<0.010	<0.010	<0.010	
Apr 20	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
May 20	0.016	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	
Jun 20	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.010	
Jul 20	<0.010	<0.010	<0.010	0.010	<0.010	<0.010	<0.010	
Aug 20	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Sept 20	<0.010	<0.010	<0.010	0.034	<0.010	<0.010	<0.010	
Oct 20	<0.010	0.084	0.014	0.010	<0.010	<0.010	<0.010	
Nov 20	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Dec 20	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Jan 21	<0.010	<0.010	0.031	<0.010	<0.010	<0.010	<0.010	
Feb 21	<0.010	<0.010	<0.010	0.131	**0.312**	<0.010	<0.010	
Mar 21	<0.010	<0.010	<0.010	0.039	**0.202**	***<0.010**	<0.010	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	

Jun 21	<0.010	<0.010	<0.010	0.027	<0.010	<0.010	<0.010	
Jul 21	<0.010	<0.010	<0.010	0.021	0.051	<0.010	0.025	
Aug 21	<0.010	<0.010	<0.010	0.018	<0.010	<0.010	<0.010	
Sept 21	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Oct 21	0.041	<0.010	0.011	0.017	<0.010	0.012	<0.010	
Nov 21	<0.010	<0.010	0.017	<0.010	0.01	<0.010	<0.010	
Dec 21	0.034	0.015	0.012	0.015	0.013	*<0.010	<0.010	***Sample taken at Lions Park**
Jan 22	<0.010	<0.010	0.01	0.141	0.019	0.01	<0.010	
Feb 22	<0.010	<0.010	0.025	0.015	<0.010	***<0.010**	<0.010	***Sample taken at Racecourse**

Boron B								
Aesthetic Level: 4								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.041	0.055	0.058	0	NA	0.082	0.081	Only 1 sample taken at McKinlay
Aug 17	0.042	0.063	0.063	0	NA	0.083	0.083	Only 1 sample taken at McKinlay
Sept 17	0.05	0.073	0.074	0	NA	0.088	0.091	Only 1 sample taken at McKinlay
Oct 17	0	0	0	0	NA	0	0	Only 1 sample taken at McKinlay
Nov 17	0.04	0.071	0.069	0.057	NA	0.083	0.077	Only 1 sample taken at McKinlay
Dec 17	0.022	0.04	0.042	0.087	NA	0.063	0.061	Only 1 sample taken at McKinlay
Jan 18	0.037	0.054	0.054	0.149	0.233	0.078	0.079	
Feb 18	0.022	0.039	0.038	0.181	0.195	0.182	0.059	
Mar 18	0.036	0.057	0.057	0.181	0.222	0.075	0.051	
Apr 18	0.032	0.049	0.05	0.192	0.194	0.07	0.068	
May 18	0.043	0.060	0.060	0.194	0.253	0.089	0.082	
Jun 18	0.045	0.061	0.059	0.194	0.229	0.085	0.083	
Jul 18	0.047	0.126	0.134	0.195	0.245	0.093	0.091	
Aug 18	0.049	0.067	0.075	0.201	0.274	0.099	0.085	
Sept 18	0.046	0.069	0.069	0.201	0.271	0.084	0.101	
Oct 18	0.047	0.070	0.061	0.202	0.250	0.094	0.10	
Nov 18	0.047	0.07	0.069	0.208	0.250	0.089	0.087	
Dec 18	0.043	0.060	0.064	0.213	0.221	0.080	0	
Jan 19	0.052	0.074	0.076	0.217	0.248	0.100	0.098	

Feb 19	0	0	0	0.217	0	0	0	No sampling undertaken
Mar 19	0.046	0.061	0.062	0.217	0.213	0.08	0.081	
Apr 19	0.043	0.057	0.057	0.217	0.227	0.219	0.081	
May 19	0.041	0.059	0.058	0.218	0.22	0.081	0.076	
Jun 19	0	0	0	0.218	0	0	0	No sampling undertaken
Jul 19	0.041	0.066	0.062	0.219	0.257	0.088	0.091	
Aug 19	0.056	0.07	0.071	0.221	0.196	0.087	0.088	
Sept 19	0.048	0.071	0.067	0.224	0.244	0.096	0.097	
Oct 19	0.039	0.059	0.056	0.225	0.212	0.075	0.07	
Nov 19	0.041	0.054	0.056	0.226	0.199	0.074	0.073	
Dec 19	0.043	0.065	0.062	0.227	0.219	0.084	0.085	
Jan 20	0.042	0.057	0.057	0.229	0.187	0.075	0.074	
Feb 20	0.043	0.106	1.08	0.23	0.301	0.124	0.113	
Mar 20	0.05	0.078	0.078	0.232	0.263	0.103	<0.010	
Apr 20	0.038	0.057	0.06	0.234	0.209	0.076	0.075	
May 20	0.038	0.057	0.056	0.237	0.188	0.079	0.075	
Jun 20	0.047	0.066	0.072	0.244	0.117	0.089	0.095	
Jul 20	0.047	0.071	0.077	0.245	0.268	0.096	0.093	
Aug 20	0.047	0.065	0.063	0.247	0.236	0.093	0.09	
Sept 20	0.048	0.07	0.066	0.249	0.257	0.101	0.089	
Oct 20	0.041	0.059	0.054	0.249	0.212	0.077	0.08	
Nov 20	0.05	0.072	0.069	0.251	0.259	0.097	0.098	
Dec 20	0.04	0.057	0.058	0.252	0.232	0.083	0.079	
Jan 21	0.037	0.049	0.049	0.253	0.192	0.072	0.072	
Feb 21	0.045	0.064	0.064	0.253	0.232	0.092	0.093	
Mar 21	<0.004	0.018	0.016	0.254	0.201	***0.046**	0.049	***Sample taken at Racecourse**
Apr 21	0	0	0	0.254	0	0	0	No sampling undertaken
May 21	0.026	0.038	0.036	0.254	0.149	0.054	0.051	

Jun 21	0.045	0.066	0.065	0.255	0.233	0.088	0.085	
Jul 21	0.041	0.06	0.058	0.256	0.213	0.08	0.081	
Aug 21	0.046	0.083	0.068	0.261	0.242	0.098	0.091	
Sept 21	0.02	0.026	0.023	0.264	0.088	0.034	0.033	
Oct 21	0.05	0.070	0.072	0.265	0.273	0.101	0.102	
Nov 21	0.035	0.05	0.054	0.265	0.213	0.067	0.064	
Dec 21	0.048	0.068	0.074	0.268	0.265	***0.092**	0.095	***Sample taken at Lions Park**
Jan 22	0.049	0.075	0.065	0.272	0.271	0.122	0.098	
Feb 22	0.043	0.061	0.065	0.353	0.228	***0.082**	0.084	***Sample taken at Racecourse**

Iron FE

Aesthetic Level: 0.3

Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.08	0.25	**5.1**	0.13	NA	**2.4**	0.02	Only 1 sample taken at McKinlay
Aug 17	0.06	**0.88**	**1.2**	0.11	NA	0.03	0.04	Only 1 sample taken at McKinlay
Sept 17	0.07	**0.94**	**2.9**	0.092	NA	0.06	0.01	Only 1 sample taken at McKinlay
Oct 17	0.03	0.23	**1**	0.04	NA	<0.005	<0.005	Only 1 sample taken at McKinlay
Nov 17	0.07	0.07	**2.2**	0.07	NA	**0.98**	0.01	Only 1 sample taken at McKinlay
Dec 17	0.08	0.13	**6.7**	0.08	NA	0.03	0.02	Only 1 sample taken at McKinlay
Jan 18	0.08	0.24	**0.94**	0.06	0.05	0.25	0.06	
Feb 18	0.08	**0.84**	**1.1**	0.07	0.06	0.02	0.01	
Mar 18	0.09	**0.54**	**1.9**	0.07	0.06	**4.6**	0.07	
Apr 18	0.09	**0.56**	**2.3**	0.096	0.06	**5.8**	0.04	
May 18	0.08	0.24	**1.9**	0.07	0.06	0.05	0.02	
Jun 18	0.05	0.20	**3.7**	0.14	0.097	0.05	0.02	
Jul 18	0.08	0.18	**3.4**	0.11	0.095	0.04	0.03	
Aug 18	0.08	0.27	**1.6**	0.096	0.08	0.04	0.08	
Sept 18	0.07	0.19	**1.4**	0.09	0.07	0.06	0.16	
Oct 18	0.08	0.30	**3.3**	0.08	0.05	0.04	0.04	
Nov 18	0.07	0.19	**2.9**	0.10	0.10	0.03	0.06	
Dec 18	0.08	0.27	**6.8**	0.06	0.16	0.03	0	
Jan 19	0.08	**0.34**	**21.2**	0.07	0.13	0.07	0.29	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	0.08	**0.4**	**8**	0.091	0.08	0.5	0.24	
Apr 19	0.092	0.26	**2.8**	0.09	0.003	0.02	0.08	
May 19	0.04	**0.48**	**4.5**	0.06	0.06	0.03	0.15	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	0.05	**0.99**	**1.7**	0.091	0.05	0.13	0.09	
Aug 19	0.06	**1.9**	**29.5**	0.07	0.04	0.15	0.19	
Sept 19	0.09	**0.33**	**18.2**	0.07	0.03	0.02	0.06	
Oct 19	0.06	**0.32**	**47.2**	0.07	0.06	0.03	0.03	
Nov 19	0.07	**0.4**	**4.1**	0.05	<0.002	0.02	0.01	
Dec 19	0.08	0.24	**17.5**	0.06	0.04	0.01	0.02	
Jan 20	0.08	**0.53**	**89.3**	0.05	0.04	0.01	0.08	
Feb 20	0.04	**0.87**	**302**	0.11	0.02	0.07	0.14	
Mar 20	0.09	**0.57**	**62.9**	0.06	0.009	0.03	0.2	
Apr 20	0.07	**0.49**	**2.2**	0.03	0.01	0.03	0.16	
May 20	0.08	**1.1**	**2.6**	0.04	0.02	0.01	0.21	
Jun 20	0.07	**0.36**	**2.2**	0.03	0.005	0.19	<0.002	
Jul 20	0.14	**0.59**	**9.4**	0.06	0.03	0.07	0.15	
Aug 20	0.06	**0.74**	**12.8**	0.02	0.02	0.07	0.2	
Sept 20	0.06	**0.67**	**14.3**	0.1	0.02	0.03	0.17	
Oct 20	0.07	**0.66**	**16.5**	0.04	0.03	0.06	0.16	
Nov 20	0.04	**0.61**	**16**	0.02	0.02	0.095	0.14	
Dec 20	0.04	**0.75**	**1.4**	0.02	0.02	0.1	0.099	
Jan 21	0.13	**0.82**	**142**	0.08	0.03	0.15	0.05	
Feb 21	0.07	**1.9**	**3.6**	0.094	**0.49**	0.09	0.29	
Mar 21	0.092	**0.62**	**18**	0.05	**0.53**	***0.04**	0.04	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	0.03	**0.49**	**2.4**	0.03	0.005	0.009	0.01	

Jun 21	0.06	**0.68**	**2.8**	0.04	0.2	0.04	0.1	
Jul 21	0.05	**1.4**	**8.3**	0.04	0.05	0.096	0.07	
Aug 21	0.04	**0.69**	**6.1**	0.05	0.02	0.02	0.01	
Sept 21	0.02	0.26	**0.7**	0.02	0.009	0.01	0.05	
Oct 21	0.02	**0.50**	**4.1**	0.05	0.009	0.24	0.05	
Nov 21	0.14	**0.75**	**33.4**	0.08	0.03	0.02	0.03	
Dec 21	0.04	**0.52**	**6.5**	0.06	0.03	***0.29**	0.07	***Sample taken at Lions Park**
Jan 22	0.1	**0.99**	**15.2**	0.19	0.06	**0.57**	0.1	
Feb 22	0.05	**13.1**	**0.35**	0.09	0.02	***0.22**	0.17	***Sample taken at Racecourse**

Manganese Mn								
Health Level: 0.5 Aesthetic Level: 0.1								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.12	0.004	0.23	0.008	NA	0.08	0.03	Only 1 sample taken at McKinlay
Aug 17	0.1	0.01	0.13	0.004	NA	0.03	0.03	Only 1 sample taken at McKinlay
Sept 17	0.1	0.02	0.18	0.004	NA	0.02	0.03	Only 1 sample taken at McKinlay
Oct 17	0.11	0.05	0.17	0.004	NA	0.03	0.05	Only 1 sample taken at McKinlay
Nov 17	0.12	<0.001	0.25	<0.001	NA	0.07	0.03	Only 1 sample taken at McKinlay
Dec 17	0.11	0.06	0.29	0.005	NA	0.01	0.04	Only 1 sample taken at McKinlay
Jan 18	0.11	0.08	0.15	0.002	<0.001	0.03	0.05	
Feb 18	0.11	0.07	0.16	0.007	0.001	0.03	0.03	
Mar 18	0.11	0.06	0.2	0.003	<0.001	0.12	0.02	
Apr 18	0.11	0.11	0.15	0.009	<0.001	0.23	0.03	
May 18	0.11	0.001	0.16	0.006	0.001	0.03	0.03	
Jun 18	0.11	0.002	0.20	0.02	0.003	0.01	0.03	
Jul 18	0.13	0.007	0.24	0.007	<0.001	0.03	0.03	
Aug 18	0.12	0.001	0.15	0.007	0.002	0.03	0.02	
Sept 18	0.10	0.001	0.15	0.006	<0.001	0.02	0.02	
Oct 18	0.12	0.009	0.22	0.008	<0.001	0.03	0.03	
Nov 18	0.12	0.05	0.19	0.008	0.002	0.03	0.04	
Dec 18	0.12	0.002	0.28	0.007	0.003	0.03		
Jan 19	0.12	0.006	0.73	0.008	0.01	0.03	0.03	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	**0.11**	0.004	**0.22**	0.01	0.008	0.05	0.03	
Apr 19	**0.11**	0.001	**0.15**	0.006	0.0003	0.02	0.03	
May 19	**0.11**	0.002	**0.22**	0.006	0.004	0.05	0.03	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	**0.12**	0.009	**0.15**	0.008	0.007	0.03	0.04	
Aug 19	**0.11**	0.03	**2.3**	0.008	0.0003	0.02	0.04	
Sept 19	**0.12**	0.02	**1.8**	0.008	0.01	0.03	0.03	
Oct 19	**0.12**	0.01	**4.6**	0.009	0.007	0.03	0.03	
Nov 19	**0.11**	0.02	**0.12**	0.005	0.0005	0.03	0.03	
Dec 19	**0.12**	0.009	**1.8**	0.06	0.04	0.01	0.03	
Jan 20	**0.11**	0.009	**9.7**	0.007	0.004	0.03	0.03	
Feb 20	**0.11**	0.006	**0.46**	0.02	0.01	0.02	0.04	
Mar 20	**0.11**	0.06	**7.7**	0.01	0.002	0.008	0.04	
Apr 20	**0.11**	0.05	**0.23**	0.005	<0.0003	0.03	0.03	
May 20	**0.1**	0.01	**0.21**	0.009	0.001	0.01	0.03	
Jun 20	**0.11**	0.002	**0.16**	0.004	0.0004	0.03	0.003	
Jul 20	**0.11**	0.005	**0.49**	0.02	0.0004	0.01	0.03	
Aug 20	**0.11**	0.01	**0.38**	0.0003	0.0003	**0.13**	0.06	
Sept 20	**0.12**	0.007	**0.51**	0.04	<0.0003	0.02	0.05	
Oct 20	**0.11**	0.07	**0.29**	0.005	0.001	**0.14**	0.04	
Nov 20	**0.11**	0.03	**2.7**	0.006	0.0006	0.03	0.04	
Dec 20	**0.11**	0.08	**0.17**	0.007	0.001	0.03	0.03	
Jan 21	**0.1**	0.008	**1.4**	0.007	0.0007	0.11	0.02	
Feb 21	**0.11**	0.04	**0.14**	0.003	0.04	0.02	0.03	
Mar 21	**0.11**	0.02	**0.33**	0.006	0.05	***0.03**	0.03	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	**0.09**	0.006	**0.19**	0.005	0.0005	0.02	0.02	

Jun 21	**0.1**	0.01	**0.16**	0.006	0.0004	0.02	0.03	
Jul 21	**0.11**	0.06	**0.2**	0.007	0.002	0.03	0.03	
Aug 21	**0.13**	0.02	**0.21**	0.009	0.0006	0.03	0.03	
Sept 21	0.05	0.003	0.07	0.003	<0.0003	0.005	0.01	
Oct 21	**0.11**	0.007	**0.19**	0.006	0.0005	0.04	0.03	
Nov 21	**0.11**	0.07	**0.42**	0.007	0.005	0.03	0.03	
Dec 21	**0.14**	0.006	**0.23**	0.006	0.002	***0.04**	0.04	***Sample taken at Lions Park**
Jan 22	**0.13**	0.01	**0.68**	0.01	0.008	0.03	0.04	
Feb 22	**0.11**	**0.34**	0.01	0.007	0.001	***0.05**	0.04	***Sample taken at Racecourse**

Copper Cu

Health Level: 2 Aesthetic Level: 1

Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.003	0.007	0.042	0.001	NA	0.04	0.101	Only 1 sample taken at McKinlay
Aug 17	0.002	0.005	0.006	0.007	NA	0.074	0.089	Only 1 sample taken at McKinlay
Sept 17	0.003	0.012	0.01	<0.001	NA	<0.001	0.06	Only 1 sample taken at McKinlay
Oct 17	<0.001	<0.001	0.013	<0.001	NA	0.006	0.035	Only 1 sample taken at McKinlay
Nov 17	<0.001	0.005	0.033	<0.001	NA	<0.001	0.019	Only 1 sample taken at McKinlay
Dec 17	<0.001	<0.001	0.033	<0.001	NA	0.01	0.018	Only 1 sample taken at McKinlay
Jan 18	0.001	0.007	0.006	0.001	<0.001	0.001	0.017	
Feb 18	0.003	0.006	0.007	<0.001	0.001	<0.001	0.016	
Mar 18	0.014	<0.001	0.007	0.002	0.001	0.007	0.015	
Apr 18	0.002	0.001	0.006	0.003	0.005	0.039	0.027	
May 18	0.003	0.005	0.008	0.001	0.002	0.005	0.01	
Jun 18	0.005	0.004	0.011	<0.001	0.001	0.001	0.011	
Jul 18	<0.001	0.005	0.007	0.005	0.002	0.006	0.022	
Aug 18	0.012	0.004	0.006	0.003	<0.021	0.021	0.005	
Sept 18	0.002	0.002	0.005	<0.001	0.006	0.003	0.057	
Oct 18	0.001	0.009	0.007	0.001	0.001	0.004	0.018	
Nov 18	0.003	0.002	0.007	0.003	0.013	0.006	0.053	
Dec 18	0.005	0.007	0.031	<0.002	0.261	0.006		

Jan 19	0.006	0.004	0.070	<0.002	0.020	0.005	0.160	
Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	0.004	<0.002	0.011	<0.002	0.002	0.002	0.11	
Apr 19	0.032	0.005	0.023	0.004	0.202	0.003	0.002	
May 19	0.003	0.002	0.009	0.003	0.013	0.005	0.063	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	0.005	0.003	0.031	<0.002	0.045	0.009	0.022	
Aug 19	0.003	0.003	0.003	0.042	<0.002	0.022	0.009	
Sept 19	<0.002	0.003	0.034	<0.002	0.004	0.006	0.004	
Oct 19	0.008	0.002	0.068	<0.002	0.005	0.006	0.002	
Nov 19	<0.002	<0.002	0.007	<0.002	0.033	0.004	<0.002	
Dec 19	<0.002	0.003	0.055	0.002	<0.002	0.006	0.002	
Jan 20	<0.002	0.005	0.483	0.002	<0.002	0.003	0.003	
Feb 20	<0.002	0.003	**1.02**	<0.002	0.006	0.013	<0.002	
Mar 20	<0.002	<0.002	0.232	<0.002	0.005	0.01	0.011	
Apr 20	<0.002	0.003	0.074	<0.002	0.005	0.01	<0.002	
May 20	<0.002	<0.002	0.02	0.004	<0.002	0.003	0.016	
Jun 20	0.008	0.005	0.016	0.003	0.262	0.004	0.026	
Jul 20	0.009	0.005	0.097	<0.002	0.054	0.285	<0.002	
Aug 20	<0.002	0.002	0.266	0.004	0.058	0.004	<0.002	
Sept 20	0.004	0.002	0.144	<0.002	<0.002	0.003	<0.002	
Oct 20	0.006	0.003	0.066	<0.002	0.004	0.014	0.003	
Nov 20	0.003	<0.002	0.057	<0.002	0.005	<0.002	0.003	
Dec 20	0.008	0.004	<0.002	0.002	<0.002	<0.002	<0.002	
Jan 21	0.012	0.003	0.025	<0.002	<0.002	0.005	<0.002	
Feb 21	<0.002	0.003	0.009	0.002	0.019	0.009	0.009	
Mar 21	0.004	0.003	0.048	0.007	0.042	***0.02**	0.036	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken

May 21	<0.002	0.004	0.004	0.008	0.055	<0.002	0.035	
Jun 21	0.003	0.013	0.011	0.021	0.019	0.006	0.039	
Jul 21	<0.002	0.002	0.006	0.028	0.023	0.006	0.028	
Aug 21	0.016	0.006	0.019	0.128	0.033	0.015	0.046	
Sept 21	<0.002	<0.002	0.013	<0.002	<0.002	0.004	0.009	
Oct 21	0.004	0.011	0.09	0.023	0.024	<0.002	0.011	
Nov 21	0.034	0.004	**1.49**	0.042	<0.002	0.019	0.014	
Dec 21	<0.002	0.004	0.105	<0.002	0.003	***<0.002**	0.007	***Sample taken at Lions Park**
Jan 22	0.019	0.006	0.081	0.076	0.002	0.051	0.024	
Feb 22	<0.002	0.35	0.006	0.004	0.021	***0.008**	0.01	***Sample taken at Racecourse**

Zinc Zn

Aesthetic Level: 3

Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.008	0.073	0.974	<0.005	NA	0.017	0.006	Only 1 sample taken at McKinlay
Aug 17	<0.005	0.025	0.017	<0.005	NA	0.005	0.005	Only 1 sample taken at McKinlay
Sept 17	<0.005	0.048	0.086	<0.005	NA	<0.005	<0.005	Only 1 sample taken at McKinlay
Oct 17	<0.005	0.008	0.015	<0.005	NA	<0.005	<0.005	Only 1 sample taken at McKinlay
Nov 17	<0.005	<0.005	0.121	<0.005	NA	0.005	<0.005	Only 1 sample taken at McKinlay
Dec 17	<0.005	<0.005	0.311	<0.005	NA	<0.005	<0.005	Only 1 sample taken at McKinlay
Jan 18	0.008	0.014	0.016	<0.005	<0.005	0.005	0.01	
Feb 18	0.011	0.012	0.02	<0.005	<0.005	<0.005	<0.005	
Mar 18	0.007	0.009	0.064	<0.005	<0.005	0.007	0.025	
Apr 18	<0.005	0.008	0.046	<0.005	<0.005	0.013	<0.005	
May 18	0.006	0.007	0.027	<0.005	<0.005	<0.005	<0.005	
Jun 18	0.008	0.006	0.074	<0.005	<0.005	0.009	<0.005	
Jul 18	<0.005	0.006	0.08	0.006	<0.005	0.019	<0.005	
Aug 18	0.006	0.007	0.015	<0.005	<0.005	<0.005	<0.005	
Sept 18	0.006	<0.005	0.016	<0.005	<0.005	<0.005	<0.005	
Oct 18	<0.005	0.01	0.093	<0.005	<0.005	<0.005	<0.005	
Nov 18	0.013	0.01	0.044	0.013	0.018	0.012	0.011	
Dec 18	0.01	0.016	0.177	0.009	0.177	0.011	0	

Jan 19	0.028	0.004	0.399	0.003	0.015	0.004	0.004	
Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	0.017	0.003	0.112	0.004	0.003	0.003	0.004	
Apr 19	0.018	0.016	0.034	0.006	0.380	0.004	0.002	
May 19	0.004	0.004	0.043	0.002	0.009	0.003	0.002	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	0.002	0.008	0.036	0.004	0.013	0.005	0.003	
Aug 19	<0.013	0.007	0.543	0.004	0.015	0.005	0.003	
Sept 19	0.008	0.006	0.459	0.004	0.008	0.004	0.002	
Oct 19	0.03	0.004	1.08	0.003	0.005	0.004	0.002	
Nov 19	0.006	0.002	0.048	0.001	0.05	0.002	<0.001	
Dec 19	0.005	0.003	0.299	0.002	0.024	0.004	0.002	
Jan 20	0.008	0.01	**3.83**	0.005	0.004	0.006	0.016	
Feb 20	0.034	0.011	**9.02**	0.009	0.011	0.009	0.005	
Mar 20	0.013	0.005	1.9	0.006	0.009	0.006	0.003	
Apr 20	0.011	0.007	0.108	0.004	0.006	0.004	0.003	
May 20	0.015	0.009	0.053	0.006	0.006	0.005	0.008	
Jun 20	0.072	0.014	0.049	0.006	0.044	0.005	0.02	
Jul 20	0.038	0.011	0.613	0.009	0.03	0.038	0.003	
Aug 20	0.017	0.007	0.117	0.01	0.079	0.006	0.004	
Sept 20	0.078	0.006	0.192	0.011	0.005	0.006	0.004	
Oct 20	0.012	0.013	0.705	0.005	0.005	0.021	0.007	
Nov 20	0.014	0.004	0.328	0.003	0.005	<0.001	0.003	
Dec 20	0.027	0.014	0.003	0.003	0.002	0.002	0.005	
Jan 21	0.015	0.003	1.18	0.003	0.002	0.002	0.002	
Feb 21	0.006	0.006	0.012	0.005	0.022	0.003	0.003	
Mar 21	0.028	0.004	0.326	0.012	0.029	***0.004**	0.005	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken

May 21	0.012	0.004	0.006	0.023	0.028	0.001	0.006	
Jun 21	0.022	0.013	0.005	0.029	0.011	0.002	0.006	
Jul 21	0.036	0.007	0.103	0.076	0.022	0.021	0.007	
Aug 21	0.053	0.016	0.199	0.114	0.039	0.008	0.007	
Sept 21	0.006	0.002	0.014	<0.001	0.002	0.01	0.002	
Oct 21	0.038	0.007	0.098	0.02	0.025	<0.001	0.005	
Nov 21	0.012	0.005	0.675	0.03	0.003	0.003	0.007	
Dec 21	0.021	0.003	0.221	0.006	0.004	***0.002**	0.004	***Sample taken at Lions Park**
Jan 22	0.202	0.007	0.735	0.143	0.005	0.056	0.005	
Feb 22	0.035	0.557	0.006	0.012	0.011	***0.003**	0.003	***Sample taken at Racecourse**

Ammonia (mg/L as N)								
Aesthetic Level: 0.5								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.28	<0.02	0.19	0.02	NA	<0.02	0.29	Only 1 sample taken at McKinlay
Aug 17	0.16	<0.02	0.16	**0.51**	NA	0.22	0.18	Only 1 sample taken at McKinlay
Sept 17	0.2	<0.02	0.16	0.28	NA	0.27	0.31	Only 1 sample taken at McKinlay
Oct 17	0.19	<0.02	0.24	0.21	NA	0.18	0.27	Only 1 sample taken at McKinlay
Nov 17	0.21	<0.02	0.2	<0.02	NA	0.23	0.3	Only 1 sample taken at McKinlay
Dec 17	0.23	<0.02	0.2	0.45	NA	0.27	0.32	Only 1 sample taken at McKinlay
Jan 18	0.4	0.06	0.18	0.21	0.02	0.23	0.27	
Feb 18	0.011	0.012	0.02	<0.005	<0.02	0.26	0.24	
Mar 18	0.13	<0.02	0.08	<0.02	<0.02	0.03	0.14	
Apr 18	0.18	<0.02	0.14	**0.56**	0.02	0.17	0.3	
May 18	0.2	<0.02	0.14	**0.53**	0.43	0.28	0.29	
Jun 18	0.23	<0.02	0.14	0.44	<0.02	0.06	0.29	
Jul 18	0.20	<0.02	0.22	0.41	<0.02	0.25	0.30	
Aug 18	0.22	<0.02	0.16	0.44	<0.02	0.3	0.04	
Sept 18	0.26	0.04	0.19	0.45	0.02	0.23	0.33	
Oct 18	0.20	<0.02	0.14	0.43	<0.02	0.21	0.29	
Nov 18	0.20	<0.02	0.15	0.44	0.05	0.20	0.30	
Dec 18	0.23	<0.02	0.22	0.50	<0.02	0.29	0	
Jan 19	0.19	<0.02	0.20	0.49	<0.02	0.08	0.21	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	0.2	0.09	0.19	0.38	0	0.24	0.29	
Apr 19	0.20	<0.02	0.09	0.43	<0.02	0.11	0.31	
May 19	0.23	<0.02	0.16	**0.55**	<0.02	0.32	0.35	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	0.22	<0.02	0.02	0.46	<0.02	0.28	0.30	
Aug 19	0.2	<0.02	0.14	0.41	<0.02	0.15	0.28	
Sept 19	0.21	<0.02	0.14	0.49	<0.02	0.31	0.34	
Oct 19	0.20	<0.02	0.17	0.45	0.05	0.23	0.29	
Nov 19	0.20	<0.02	0.16	0.37	<0.02	0.24	0.30	
Dec 19	0.21	<0.02	0.18	0.45	<0.02	0.28	0.29	
Jan 20	0.19	<0.02	0.04	0.46	<0.02	0.25	0.25	
Feb 20	0.21	<0.02	0.17	0.15	<0.02	<0.02	0.28	
Mar 20	0.19	<0.02	0.15	0.11	<0.02	<0.02	0.28	
Apr 20	0.20	<0.02	0.19	0.14	<0.02	0.21	0.3	
May 20	0.19	<0.02	0.18	0.25	<0.02	0.13	0.28	
Jun 20	0.19	<0.02	0.16	0.2	<0.02	0.29	0.15	
Jul 20	0.22	<0.02	0.17	0.27	<0.02	<0.02	0.28	
Aug 20	0.2	<0.02	0.15	<0.02	<0.02	0.31	0.3	
Sept 20	0.2	<0.02	0.11	0.17	<0.02	0.29	0.3	
Oct 20	0.20	0.03	0.19	0.21	0.03	0.29	0.29	
Nov 20	0.23	<0.02	0.28	0.47	<0.02	0.34	0.34	
Dec 20	0.15	0.08	0.28	0.35	<0.02	0.29	0.29	
Jan 21	0.18	<0.02	0.17	0.27	<0.02	0.28	0.29	
Feb 21	0.15	<0.02	<0.02	0.02	<0.02	<0.02	0.05	
Mar 21	0.19	<0.02	0.14	**0.56**	**0.61**	***0.30**	0.08	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	0.22	<0.02	0.23	0.43	<0.02	0.22	0.17	

Jun 21	0.19	<0.02	0.33	**0.59**	<0.02	0.17	0.04	
Jul 21	0.16	<0.02	0.2	**0.64**	<0.02	0.28	<0.02	
Aug 21	0.2	<0.02	0.22	**0.63**	<0.02	0.23	0.28	
Sept 21	0.18	<0.02	0.2	**0.58**	<0.02	0.23	0.17	
Oct 21	0.14	<0.02	0.33	**0.7**	<0.02	0.35	0.34	
Nov 21	0.23	<0.02	0.19	**0.63**	<0.02	<0.02	0.33	
Dec 21	0.18	<0.02	0.22	0.26	<0.02	***0.32**	0.32	***Sample taken at Lions Park**
Jan 22	0.2	<0.02	0.27	0.45	0.12	0.3	0.32	
Feb 22	0.2	0.21	<0.02	0.19	<0.02	***0.26**	0.31	***Sample taken at Racecourse**

Oxidised Nitrogen (mg/L as N)								
Health Level: 11.3 (as Nitrate)								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	<0.01	0.35	0.12	0.88	NA	0.37	0.01	Only 1 sample taken at McKinlay
Aug 17	<0.01	0.34	0.15	0.04	NA	0.02	0.07	Only 1 sample taken at McKinlay
Sept 17	<0.01	0.33	0.12	0.38	NA	0.02	<0.01	Only 1 sample taken at McKinlay
Oct 17	<0.01	0.34	0.08	0.47	NA	0.11	<0.01	Only 1 sample taken at McKinlay
Nov 17	<0.01	0.41	0.15	0.78	NA	0.01	<0.01	Only 1 sample taken at McKinlay
Dec 17	<0.01	0.26	0.11	0.19	NA	0.03	<0.01	Only 1 sample taken at McKinlay
Jan 18	<0.01	0.2	0.08	0.44	0.57	<0.01	<0.01	
Feb 18	<0.01	0.27	0.11	0.16	0.73	<0.01	<0.05	
Mar 18	<0.01	0.29	0.17	0.81	0.80	0.17	<0.01	
Apr 18	<0.01	0.24	0.12	0.07	0.8	0.18	<0.01	
May 18	<0.01	0.33	0.15	0.04	0.19	<0.01	<0.01	
Jun 18	0.01	0.29	0.14	0.19	0.65	0.23	0.01	
Jul 18	<0.01	0.44	0.15	0.14	0.90	0.02	0.02	
Aug 18	<0.01	0.31	0.13	0.14	0.75	<0.01	0.35	
Sept 18	<0.01	0.32	0.13	0.17	0.76	0.14	<0.01	
Oct 18	<0.01	0.33	0.14	0.15	0.66	0.04	<0.01	
Nov 18	<0.01	0.22	0.09	0.14	0.54	0.04	<0.01	
Dec 18	<0.01	0.09	<0.01	0.17	0.78	<0.01	0	
Jan 19	<0.01	0.32	0.11	0.16	0.76	0.19	0.10	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	<0.01	0.15	0.06	0.17	0.62	0.01	<0.01	
Apr 19	<0.01	0.35	0.24	0.22	1.00	0.20	<0.01	
May 19	<0.01	0.3	0.14	0.18	0.74	<0.01	<0.01	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	<0.01	0.34	0.31	0.19	0.81	0.01	0.01	
Aug 19	<0.01	0.23	0.13	0.13	0.64	0.16	<0.01	
Sept 19	<0.01	<0.01	<0.01	0.14	0.81	<0.01	<0.01	
Oct 19	<0.01	0.33	0.13	0.19	0.69	0.05	<0.01	
Nov 19	<0.01	0.33	0.11	0.27	0.83	0.01	<0.01	
Dec 19	<0.01	0.34	0.13	0.18	0.75	<0.01	<0.01	
Jan 20	<0.01	0.37	0.31	0.24	0.79	0.02	0.02	
Feb 20	<0.01	0.36	0.14	0.55	0.58	0.4	<0.01	
Mar 20	<0.01	0.25	0.13	0.47	0.81	0.25	<0.01	
Apr 20	<0.01	0.34	0.09	0.63	0.83	0.11	<0.01	
May 20	0.01	0.35	0.11	0.48	0.76	0.17	0.01	
Jun 20	<0.01	0.34	0.12	0.52	0.75	<0.01	0.52	
Jul 20	<0.01	0.35	0.14	0.46	0.83	0.39	<0.01	
Aug 20	<0.01	0.34	0.14	0.85	0.82	<0.01	<0.01	
Sept 20	<0.01	0.33	0.2	0.53	0.77	0.01	<0.01	
Oct 20	<0.01	0.27	0.09	0.48	0.75	0.02	<0.01	
Nov 20	0.01	0.33	0.05	0.25	0.77	<0.01	<0.01	
Dec 20	0.04	0.19	<0.01	0.26	0.69	<0.01	<0.01	
Jan 21	0.01	0.34	0.1	0.42	0.83	<0.01	<0.01	
Feb 21	<0.01	0.34	0.34	0.73	0.86	0.38	0.26	
Mar 21	<0.01	0.34	0.14	0.03	0.02	***<0.01**	0.24	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	<0.01	0.32	<0.01	<0.01	0.77	<0.01	<0.01	

Jun 21	0.03	0.33	<0.01	0.01	0.72	0.08	0.31	
Jul 21	<0.01	0.34	0.1	<0.01	0.74	<0.01	0.39	
Aug 21	<0.01	0.34	0.07	<0.01	0.88	0.07	<0.01	
Sept 21	<0.01	0.36	0.08	<0.01	0.83	0.04	0.24	
Oct 21	0.06	0.31	<0.01	<0.01	0.9	<0.01	<0.01	
Nov 21	<0.01	0.34	0.11	<0.01	0.65	0.33	<0.01	
Dec 21	0.05	0.3	0.07	0.42	0.73	***<0.01**	<0.01	***Sample taken at Lions Park**
Jan 22	0.03	0.38	0.05	0.24	0.7	0.02	0.01	
Feb 22	0.01	0.04	0.18	0.26	0.46	***0.47**	0.02	***Sample taken at Racecourse**

Nitrate as N (mg/L as N) Health Level: 0.91								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jun 20	<0.01	<0.01	<0.01	0.11	<0.01	<0.01	<0.01	Commenced testing for Nitrate
Jul 20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Aug 20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Sept 20	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	
Oct 20	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	
Nov 20	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Dec 20	<0.01	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	
Jan 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Feb 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Mar 21	<0.01	<0.01	<0.01	<0.01	<0.01	***<0.01**	<0.01	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Jun 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Jul 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Aug 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Sept 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Oct 21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Nov 21	<0.01	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	
Dec 21	0.02	<0.01	<0.01	0.06	<0.01	***<0.01**	<0.01	***Sample taken at Lions Park**
Jan 22	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Feb 22	<0.01	<0.01	<0.01	0.02	<0.01	***<0.01**	0.01	***Sample taken at Racecourse**

Silica Aesthetic Level: 80								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	22.7	29.7	33.6	20	NA	34.1	33.3	Only 1 sample taken at McKinlay
Aug 17	24.4	35.7	37.9	22.1	NA	35.4	37	Only 1 sample taken at McKinlay
Sept 17	24.8	37.3	37.6	22.2	NA	37.6	36.6	Only 1 sample taken at McKinlay
Oct 17	24.7	38	36.7	23.4	NA	37.4	36	Only 1 sample taken at McKinlay
Nov 17	30.6	50.2	48	28.6	NA	46.8	50.7	Only 1 sample taken at McKinlay
Dec 17	24.1	36.6	36.6	22.3	NA	38.9	34.9	Only 1 sample taken at McKinlay
Jan 18	24	38.1	37.3	22.3	22	36.3	35.8	
Feb 18	23.6	35.3	36.3	22.3	22.5	36.4	35.2	
Mar 18	26.2	39.1	38.9	23.1	23.0	40.3	26.8	
Apr 18	24.3	37.2	37.4	22.4	22.5	37.6	35.1	
May 18	24.7	37.6	38.5	22.4	22.0	36.2	36.9	
Jun 18	24.7	34.4	35.7	21.9	22.1	33.4	33.7	
Jul 18	23.0	34.0	33.4	22.9	22.3	34.5	33.7	
Aug 18	23.1	34.7	34.9	22.5	22.2	34.3	33.9	
Sept 18	23.6	35.6	36.4	22.7	22.6	36.6	34.8	
Oct 18	23.9	35.8	36.8	21.9	22.0	35.6	35.4	
Nov 18	24.9	36.8	37.7	23.5	23.2	36.4	36.2	
Dec 18	24.8	36.9	37.9	22.7	22.9	36.8	0	
Jan 19	24.5	34.6	35.3	22.3	21.9	36.0	36.1	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	24.4	37.8	41.1	23.1	23.1	37.4	35.7	
Apr 19	24.5	34.4	37.3	23.3	22.3	36.4	37.4	
May 19	25.2	39.1	39.4	22.7	23.4	38.7	38.3	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	23.9	36.2	38.6	23.6	23.3	37.6	36.0	
Aug 19	23.6	37.7	37.8	37.8	22.9	23.1	35	
Sept 19	25.6	37.3	39.2	22.6	23.1	36.2	37.3	
Oct 19	24.2	37.2	36.8	23.4	23.3	37	35.8	
Nov 19	26.2	38.9	41.1	23.2	24.2	39	37.3	
Dec 19	25.1	39	40.7	23.8	23.6	39.1	37.7	
Jan 20	24.3	34.2	53.9	21.9	21.9	36.1	35.9	
Feb 20	24.8	37.8	50.9	22.7	24.2	39.4	38.2	
Mar 20	21.4	31.3	30.6	19	19.1	32.3	30.8	
Apr 20	21.3	32.5	32.6	19.2	19.1	31.7	31.3	
May 20	21.9	32.6	33.2	19.6	19.4	33.7	32.1	
Jun 20	21.5	29.7	31.9	19.5	19.6	31.5	32.8	
Jul 20	21.4	32.6	31.5	19.3	19.4	32.4	31.9	
Aug 20	21.6	33.9	32.5	19.3	19.2	35.2	35	
Sept 20	21.3	32.7	24.1	19.4	19.6	36.5	34.9	
Oct 20	21.9	32.9	31.8	19.4	19.7	34.3	34.9	
Nov 20	22.1	33.5	33.9	19.6	19	33.3	32.7	
Dec 20	21.6	33.6	33.1	19.6	19.1	34.9	34.8	
Jan 21	22.3	33.9	58.9	18.5	18.2	33.6	33.7	
Feb 21	19.2	38.9	40.2	19.3	18.2	41.6	37.1	
Mar 21	21.8	28	29.1	20	20.8	***17.6**	27.6	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	23.9	29.7	30.2	20.8	21.4	35.2	35.5	

Jun 21	24.1	33.2	38.7	20	19.6	39.5	41.1	
Jul 21	21.7	35.0	33.5	19	19.2	37	37.3	
Aug 21	22.1	33.1	34.6	23.7	19.8	34.9	37.6	
Sept 21	22.2	32.5	33.1	18.8	18	33.6	32.8	
Oct 21	21.8	32	34.7	20	20.5	29.4	30.8	
Nov 21	22.8	35.2	25.8	21.4	20.3	31.1	30.4	
Dec 21	22.1	29.6	29.4	16.2	19.5	***26.3**	25.4	***Sample taken at Lions Park**
Jan 22	21.3	29.9	33.1	19.2	19.1	28.4	26.7	
Feb 22	21.1	32	31.1	19.4	18.5	***25.6**	28.2	***Sample taken at Racecourse**

Chloride Cl⁻								
Aesthetic Level: 250								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	36.9	49.7	50.1	58.6	NA	44.1	44.5	Only 1 sample taken at McKinlay
Aug 17	38.6	52.4	52.4	59.9	NA	44.7	44.7	Only 1 sample taken at McKinlay
Sept 17	37	50.5	50.6	58.5	NA	43.7	43.7	Only 1 sample taken at McKinlay
Oct 17	39.3	49.9	54.8	61	NA	45.6	45.6	Only 1 sample taken at McKinlay
Nov 17	38.3	59.6	60	59.5	NA	44.3	44.3	Only 1 sample taken at McKinlay
Dec 17	42.3	58	57.8	65.8	NA	49.4	49.2	Only 1 sample taken at McKinlay
Jan 18	39.5	52.9	52.4	61.4	61.5	46.3	46.1	
Feb 18	39.4	52.4	52.1	57.4	57.7	45.3	45.2	
Mar 18	39.6	52.7	52.8	60.5	60.5	46.0	32.3	
Apr 18	39.3	52.2	52.3	57.0	56.8	45.5	45.4	
May 18	39.0	51.5	51.5	57.5	57.1	44.9	44.9	
Jun 18	39.3	51.7	51.5	57.5	57.3	45.2	45.1	
Jul 18	40.7	150	167	62.1	63.8	47.9	47.2	
Aug 18	38.9	52.4	52.4	59.7	59.4	45.2	45.0	
Sept 18	39.1	52.7	51.7	60.0	59.4	45.3	45.0	
Oct 18	39.5	52.9	53.1	60.9	61.2	45.7	46.0	
Nov 18	38.8	52.2	51.8	60.1	60.1	45.4	45.5	
Dec 18	40.3	56.6	59.1	62.2	62.2	46.9	0	
Jan 19	40.0	59.4	58.5	61.8	61.8	47.1	46.9	
Feb 19	0	0	0	0	0	0	0	No sampling undertaken

Mar 19	35.9	52.7	54.1	60.8	60.8	45.8	46	
Apr 19	37.4	51.3	52.1	58.2	60.4	46.2	45.2	
May 19	39.1	52.9	53.2	61	61.3	45.2	46.2	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	39.8	52.2	51.5	59.5	59.3	45.6	44.8	
Aug 19	37.9	50.5	50	57.4	57.5	44.3	43.6	
Sept 19	38.5	50.8	50	58.5	59.3	44.1	44.0	
Oct 19	39	54.7	53.9	59.6	59.5	45	44.9	
Nov 19	36.4	49	48	56.3	56	42.6	42.3	
Dec 19	37.6	54.5	53.3	57.8	58.5	44	43.9	
Jan 20	38.0	52.2	55.6	58.7	58.8	44.1	44	
Feb 20	38.4	59.6	65.3	58.4	58.4	44.9	44.9	
Mar 20	38.8	57.7	58.1	62	62.2	45.4	44.5	
Apr 20	38.9	50.9	52.2	62.4	62.3	45.4	45.5	
May 20	39.1	51.3	51.5	62.3	62	45.5	45.4	
Jun 20	39.1	51.6	51.5	61.8	62	45.4	45.4	
Jul 20	39.2	52.3	52.1	62.6	62.5	45.7	46.6	
Aug 20	39.4	52.1	52.1	62.4	62.2	45.7	45.9	
Sept 20	39	51.2	51.5	61.8	61.6	46.4	45.5	
Oct 20	38.9	51.1	51.7	61.3	61.6	45	44.8	
Nov 20	38.4	50.6	50.6	60.7	61	44.7	44.8	
Dec 20	38.7	51.1	50.7	61.1	61.2	45.2	45	
Jan 21	38.8	51.3	51.5	61	60.9	44.8	45	
Feb 21	38.7	38.6	52	60.4	60	45.3	44.8	
Mar 21	38.8	51.6	51.6	60.9	60.6	***45.9**	45.4	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	39.0	52.1	51.6	60.7	61	46.3	45.4	
Jun 21	38.8	52.6	51	61.1	60.8	45	45	

Jul 21	38.7	53.6	54.1	60.6	61	43.7	43.9	
Aug 21	39	53	55	62.4	60.8	45.2	45.4	
Sept 21	39	53	55	62.4	60.8	45.2	45.4	
Oct 21	38.3	51.2	51.1	59.7	59.9	44	44.1	
Nov 21	38.3	51.6	51.4	59.8	59.9	44.7	44.3	
Dec 21	38.2	51.5	52.4	59.4	59.2	***44.2**	42.4	***Sample taken at Lions Park**
Jan 22	38.3	51.3	51	59.3	59.6	44.7	44.3	
Feb 22	38.6	52.7	52.9	59.7	59.6	***45.1**	44.5	***Sample taken at Racecourse**

Sulphate SO4								
Aesthetic Level: 250								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	11.4	3.3	3.2	1.4	NA	6.8	6.6	Only 1 sample taken at McKinlay
Aug 17	11.5	3.1	3.1	3.6	NA	6.7	6.7	Only 1 sample taken at McKinlay
Sept 17	11.8	4.4	4.4	4.8	NA	7.5	7.4	Only 1 sample taken at McKinlay
Oct 17	10.9	1.1	1.3	<0.50	NA	4.9	4.6	Only 1 sample taken at McKinlay
Nov 17	10.6	2.9	3	<1.0	NA	5.3	5.3	Only 1 sample taken at McKinlay
Dec 17	11	2.4	2.4	<0.50	NA	6.7	6.4	Only 1 sample taken at McKinlay
Jan 18	11.9	4.1	4.2	5.2	5.2	6.3	6.3	
Feb 18	107	<0.50	<0.50	<0.50	<0.50	3.8	3.7	
Mar 18	10.4	1.0	1.0	1.1	1.2	5.3	4.1	
Apr 18	10.6	<0.50	<0.50	<0.50	<0.50	5.1	5.0	
May 18	11.9	1.8	3.1	6.1	4.6	7.8	7.8	
Jun 18	9.2	<0.50	<0.50	<0.50	<0.50	4.0	4.0	
Jul 18	11.0	3.0	3.1	0.53	3.6	6.7	6.5	
Aug 18	10.9	3.0	3.0	3.8	3.7	6.5	6.7	
Sept 18	10.8	<0.50	2.5	4.7	4.6	6.0	5.9	
Oct 18	11.6	3.9	3.9	<0.50	4.7	7.2	7.2	
Nov 18	11.3	1.5	1.5	<0.50	<0.50	7.1	7.0	
Dec 18	11.8	4.4	4.5	5.0	4.8	7.2	0	
Jan 19	11.9	4.4	4.3	<0.50	<0.50	7.2	7.2	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	9.8	5.1	3.8	6.6	4.3	6.9	6.5	
Apr 19	10.7	2.6	2.6	3.4	3.4	6.0	6.1	
May 19	11.6	0.57	0.67	<0.50	<0.50	6.5	6.7	
Jun 19	0	0	0	0	0	0.0	0.0	No sampling undertaken
Jul 19	12.6	2.8	5.8	5.1	5.1	8.1	8.0	
Aug 19	11.2	<0.50	<0.50	<0.50	<0.50	6.5	6.4	
Sept 19	12.7	6.2	8.1	12.5	7.4	9.1	11.2	
Oct 19	12.9	5.8	7.7	12	7.2	9.3	9.2	
Nov 19	10	2.3	2.3	1.9	1.9	5.4	5.3	
Dec 19	10.4	3	3	2.2	2.3	5.7	5.8	
Jan 20	14.5	3.9	4.6	7.1	6.8	8.1	8.1	
Feb 20	13.3	3.2	3.3	4.9	5.1	8.1	11.3	
Mar 20	12.9	4.0	4.1	4.8	4.8	7.5	10.8	
Apr 20	13.6	4	4.1	6	5.8	9.9	9.3	
May 20	10.8	2.6	1.9	1.8	2.5	5.8	5.8	
Jun 20	10.6	2.4	2.2	2	2	5.7	5.8	
Jul 20	10.8	2.3	2.3	2	2	5.8	5.8	
Aug 20	9.6	1.6	1.3	2.2	1.7	4.7	4.8	
Sept 20	14.1	6	7.6	1.1	9.7	5.5	5.4	
Oct 20	8.8	1.1	1.2	1.4	2.1	4.6	4.6	
Nov 20	10.3	1.3	1.4	1.3	1.3	5	5.1	
Dec 20	11.6	2.2	2.1	1.2	1.2	5.9	6	
Jan 21	10.9	2.2	2.2	1.9	2.5	5.7	5.8	
Feb 21	11.1	11	1.9	2.4	1.5	6	5.6	
Mar 21	11	2.2	2.2	2.1	2.1	***5.8**	5.9	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	11.3	2.8	1.3	2.7	<0.50	6.1	6.3	

Jun 21	11.2	2.6	2.3	2.8	3	6.3	6.5	
Jul 21	8.2	2.5	2.4	2.9	3.2	6	6.4	
Aug 21	10.9	1.5	<0.50	1.5	1.4	5.8	5.8	
Sept 21	11	1.9	1.8	1.5	1.5	5.7	5.9	
Oct 21	10.8	1.3	0.99	<0.50	<0.50	5.4	5.3	
Nov 21	11.2	2	2.1	1.7	1.6	6.2	5.8	
Dec 21	9.9	1.4	1.4	1.4	1.4	***4.7**	4.5	***Sample taken at Lions Park**
Jan 22	13.1	4.8	4.4	<0.50	2.4	6.6	6.7	
Feb 22	11.8	1.4	1.3	<0.50	<0.50	***6.2**	6.1	***Sample taken at Racecourse**

Fluoride F								
Health Level: 1.5								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	0.16	0.29	0.3	1.43	NA	**3.12**	**3.14**	Only 1 sample taken at McKinlay
Aug 17	0.19	0.32	0.31	1.46	NA	**3.09**	**3.1**	Only 1 sample taken at McKinlay
Sept 17	0.19	0.3	0.31	1.46	NA	**3.05**	**3.06**	Only 1 sample taken at McKinlay
Oct 17	0.17	0.3	0.31	1.48	NA	**3.01**	**3.01**	Only 1 sample taken at McKinlay
Nov 17	0.17	0.32	0.32	1.44	NA	**2.99**	**3**	Only 1 sample taken at McKinlay
Dec 17	0.17	0.22	0.21	**1.5**	NA	**3.42**	**3.4**	Only 1 sample taken at McKinlay
Jan 18	0.17	0.3	0.3	**1.55**	**1.54**	**2.97**	**2.96**	
Feb 18	0.16	0.18	0.19	1.35	1.47	**2.82**	**2.83**	
Mar 18	0.16	0.27	0.28	1.41	1.46	**3.02**	**2.24**	
Apr 18	0.16	0.3	0.31	1.36	1.36	**2.85**	**2.85**	
May 18	0.16	0.31	0.31	**1.50**	**1.50**	**3.10**	**3.10**	
Jun 18	0.16	0.33	0.33	1.43	1.43	**2.88**	**2.91**	
Jul 18	0.16	0.32	0.32	**1.54**	**1.59**	**3.03**	**2.97**	
Aug 18	0.16	0.30	0.30	1.43	1.42	**2.95**	**3.00**	
Sept 18	0.16	0.30	0.30	1.47	1.41	**3.05**	**3.04**	
Oct 18	0.16	0.31	0.31	1.46	1.46	**2.88**	**2.92**	
Nov 18	0.15	0.29	0.29	1.37	1.37	**3.12**	**2.83**	
Dec 18	0.15	0.33	0.33	**1.51**	**1.51**	**3.07**	**0**	
Jan 19	0.15	0.33	0.33	1.49	1.50	**3.18**	**3.43**	

Feb 19	0.15	0	0	0	0	0	0	No sampling undertaken
Mar 19	0.15	0.35	0.33	1.4	**1.52**	**3**	**2.88**	
Apr 19	0.15	0.28	0.29	1.41	1.46	**2.88**	**3.02**	
May 19	0.15	0.31	0.32	1.42	1.43	**3.08**	**3.05**	
Jun 19	0.15	0	0	0	0	0	0	No sampling undertaken
Jul 19	0.15	0.30	0.30	1.39	1.39	**3.06**	**3.10**	
Aug 19	0.15	0.29	0.28	1.39	1.39	**2.93**	**2.89**	
Sept 19	0.15	0.33	0.29	1.37	1.4	**2.94**	**2.99**	
Oct 19	0.15	0.31	0.31	1.4	1.41	**2.95**	**3.01**	
Nov 19	0.15	0.31	0.31	1.4	1.39	**2.81**	**2.91**	
Dec 19	0.15	0.28	0.28	1.28	1.3	**3.01**	**3**	
Jan 20	0.15	0.28	0.29	1.34	1.34	**3.09**	**3.03**	
Feb 20	0.14	0.31	0.32	1.3	1.3	**2.88**	**2.84**	
Mar 20	0.14	0.28	0.28	1.19	1.19	**2.87**	**2.85**	
Apr 20	0.14	0.3	0.28	1.31	1.3	**3.1**	**2.88**	
May 20	0.14	0.32	0.32	1.34	1.34	**2.97**	**3.09**	
Jun 20	0.14	0.31	0.31	1.32	1.21	**3.04**	**3.04**	
Jul 20	0.14	0.32	0.32	1.3	1.3	**3.08**	**3.03**	
Aug 20	0.14	0.30	0.31	1.38	1.42	**3.21**	**3.27**	
Sept 20	0.14	0.28	0.29	1.26	1.23	**3.27**	**3.1**	
Oct 20	0.14	0.28	0.28	1.09	1.09	**2.83**	**2.85**	
Nov 20	0.14	0.28	0.29	1.25	1.24	**3.04**	**2.94**	
Dec 20	0.14	0.28	0.27	1.18	1.19	**3.06**	**3**	
Jan 21	0.14	0.27	0.27	1.18	1.18	**2.99**	**3**	
Feb 21	0.14	0.14	0.27	1.18	1.17	**3.15**	**3.1**	
Mar 21	0.14	0.28	0.28	1.36	1.36	***3.04**	**3.04**	***Sample taken at Racecourse**
Apr 21	0.14	0	0	0	0	0	0	No sampling undertaken
May 21	0.14	0.28	0.29	1.26	1.26	**3.23**	**3.18**	

Jun 21	0.13	0.28	0.28	1.23	1.23	**3.17**	**3.19**	
Jul 21	0.13	0.30	0.29	1.23	1.24	**3.13**	**3.12**	
Aug 21	0.13	0.30	0.29	1.3	1.25	**3.08**	**3.10**	
Sept 21	0.13	0.28	0.28	1.22	1.23	**3.12**	**3.12**	
Oct 21	0.037	0.28	0.28	1.23	1.23	**3.06**	**3.04**	
Nov 21	0.022	0.28	0.29	1.37	1.37	**3.09**	**3.09**	
Dec 21	0	0.28	0.28	1.31	1.3	***3.03**	**2.86**	***Sample taken at Lions Park**
Jan 22	0	0.28	0.28	1.35	1.34	**3.09**	**3.09**	
Feb 22	0	0.3	0.3	1.36	1.36	***3.07**	**3.04**	***Sample taken at Racecourse**

Heterotrophic Plate Count 36C

Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 19	1	<1	2	>300	139	>300	>300	Commenced testing for HPC
Aug 19	1	76	2	4	>300	7	<1	
Sept 19	38	<1	>300	7	>300	2	176	
Oct 19	252	>300	2	>300	240	<1	6	
Nov 19	<1	<1	<1	22	260	<1	1	
Dec 19	<1	8	2	4	104	4	<1	
Jan 20	64	232	>300	>300	>300	48	56	
Feb 20	>300	>300	>300	>300	216	>300	2	
Mar 20	8	18	2	1	>300	26	<1	
Apr 20	3	<1	6	>300	7	1	1	
May 20	<1	1	3	17	57	1	<1	
Jun 20	6	1	>300	93	213	10	9	
Jul 20	<1	<1	<1	<1	>300	>300	<1	
Aug 20	<1	<1	<1	25	125	<1	<1	
Sept 20	18	<1	1	9	>300	9	2	
Oct 20	27	36	7	92	>300	>300	<1	
Nov 20	<1	>300	5	<1	>300	<1	<1	
Dec 20		<1	<1	2.0	113	46	<300	
Jan 21	234	<1	>300	73.0	>300	<1	<1	

Feb 21	88	200	160	>300	>300	81	42	
Mar 21	5	<1	2	>300	>300	*1	1	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0.0	0	0	No sampling undertaken
May 21	<1	>300	~1	10	109	6	4	
Jun 21	<1	<1	<1	>300	>300	<1	<1	
Jul 21	11	1	>300	<1	>300	7.0	<1	
Aug 21	8	31.0	4	<1	4	<1	14	
Sept 21	<1	6	2	6	124	5	6	
Oct 21	1	2	<1	>300	<1	<1	<1	
Nov 21	<1	1	>300	>300	>300	1	48	
Dec 21	191	10	7	>300	>300	*>300	>300	***Sample taken at Lions Park**
Jan 22	3	<1	4	86.0	105	2	3	
Feb 22	74	>300	1	>300	123	*>300	<1	***Sample taken at Racecourse**

E.coli								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	<1	<1	<1	NA	1	<1	<1	Only 1 sample taken at McKinlay E.coli Incident # DWI-7-84-00013
Aug 17	<1	<1	<1	NA	<1	<1	<1	Only 1 sample taken at McKinlay
Sept 17	<1	<1	<1	NA	<1	<1	<1	Only 1 sample taken at McKinlay
Oct 17	<1	<1	<1	NA	<1	<1	<1	Only 1 sample taken at McKinlay
Nov 17	<1	<1	<1	NA	1	<1	<1	Only 1 sample taken at McKinlay E.coli Incident # DWI-7-84-00014
Dec 17	<1	<1	<1	NA	<1	<1	<1	Only 1 sample taken at McKinlay
Jan 18	<1	<1	<1	<1	<1	<1	<1	
Feb 18	<1	<1	<1	<1	<1	1	<1	E.coli Incident # DWI-7-84-00016
Mar 18	<1	<1	<1	5	1	<1	<1	E.coli Incident # DWI-7-84-00017
Apr 18	<1	<1	<1	<1	<1	<1	<1	
May 18	<1	<1	<1	<1	<1	<1	<1	
Jun 18	<1	<1	<1	<1	<1	<1	<1	
Jul 18	<1	<1	<1	<1	<1	<1	<1	
Aug 18	<1	<1	<1	<1	<1	<1	<1	
Sept 18	<1	<1	<1	<1	<1	<1	<1	
Oct 18	<2	<2	<2	<2	<2	<2	<2	
Nov 18	<1	<1	<1	<1	<1	<1	<1	
Dec 18	<1	<1	<1	<1	<1	<1	<1	
Jan 19	<1	<1	<1	<1	<1	<1	<1	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	<1	<1	<1	<1	<1	<1	<1	
Apr 19	<1	<1	<1	<1	<1	<1	<1	
May 19	<1	<1	<1	<1	<1	<1	<1	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	<1	<1	<1	<1	<1	<1	<1	
Aug 19	<1	<1	<1	<1	<1	<1	<1	
Sept 19	<1	<1	<1	<1	<1	<1	<1	
Oct 19	<1	<1	<1	<1	<1	<1	<1	
Nov 19	<1	<1	<1	<1	<1	<1	<1	
Dec 19	<1	<1	<1	<1	<1	<1	<1	
Jan 20	<1	<1	<1	<1	<1	<1	<1	
Feb 20	<1	<1	<1	<1	<1	<1	<1	
Mar 20	<1	<1	<1	<1	<1	**20**	<1	Incident reported. No incident number advised
Apr 20	<1	<1	<1	<1	<1	<1	<1	
May 20	<1	<1	<1	<1	<1	<1	<1	
Jun 20	<1	<1	<1	<1	<1	<1	<1	
Jul 20	<1	<1	<1	<1	<1	<1	<1	
Aug 20	<1	<1	<1	<1	<1	<1	<1	
Sept 20	<1	<1	<1	**2**	**2**	<1	<1	E.coli Incident # DWI-84-20-08521
Oct 20	<1	<1	<1	<1	<1	<1	<1	
Nov 20	<1	<1	<1	<1	<1	<1	<1	
Dec 20	<1	<1	<1	<1	<1	<1	<1	
Jan 21	<1	<1	<1	<1	<1	<1	<1	
Feb 21	<1	<1	<1	<1	<1	<1	<1	
Mar 21	<1	<1	<1	<1	<1	***<1**	<1	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	No sampling undertaken
May 21	<1	<1	<1	<1	<1	<1	<1	

Jun 21	<1	<1	<1	<1	<1	<1	<1	
Jul 21	<1	<1	<1	<1	<1	<1	<1	
Aug 21	<1	<1	<1	<1	<1	<1	<1	
Sept 21	<1	<1	<1	<1	<1	<1	<1	
Oct 21	<1	<1	<1	<1	<1	<1	<1	
Nov 21	<1	<1	<1	<1	<1	<1	<1	
Dec 21	<1	<1	<1	<1	<1	***<1**	<1	***Sample taken at Lions Park**
Jan 22	<1	<1	<1	<1	<1	<1	<1	
Feb 22	<1	<1	<1	**~8**	<1	***<1**	<1	E.coli Incident # DWI-84-22-09453 *Sample taken at Racecourse

Thermotolerant Coliforms								
Month	Nelia	Kynuna - Reticulation	Kynuna - Bore	McKinlay - Bore	McKinlay - Reticulation	Julia Creek - Amberley Dr	Julia Creek Depot	Comments
Jul 17	<1	<1	<1	NA	1	<1	<1	Only 1 sample taken at McKinlay
Aug 17	<1	<1	<1	NA	<1	<1	<1	Only 1 sample taken at McKinlay
Sept 17	<1	<1	<1	NA	<1	<1	<1	Only 1 sample taken at McKinlay
Oct 17	<1	<1	<1	NA	<1	<1	<1	Only 1 sample taken at McKinlay
Nov 17	<1	<1	<1	NA	201	<1	<1	Only 1 sample taken at McKinlay
Dec 17	<1	<1	<1	NA	4	<1	<1	Only 1 sample taken at McKinlay
Jan 18	<1	<1	<1	1	1	<1	<1	
Feb 18	<1	<1	<1	<1	1	2	1	
Mar 18	<1	<1	<1	18	11	1	<1	
Apr 18	<1	<1	<1	<1	1	1	1	
May 18	<1	<1	<1	<1	<1	<1	<1	
Jun 18	<1	<1	<1	<1	2	<1	<1	
Jul 18	17	2	<1	8	1	<1	<1	
Aug 18	<1	<1	<1	<1	<1	<1	<1	
Sept 18	<1	<1	<1	<1	<1	<1	<1	
Oct 18	<2	<2	<2	<2	<2	<2	<2	
Nov 18	<1	<1	<1	<1	<1	<1	<1	
Dec 18	<1	<1	<1	<1	<1	<1	<1	
Jan 19	<1	<1	<1	<1	<1	<1	<1	

Feb 19	0	0	0	0	0	0	0	No sampling undertaken
Mar 19	<1	<1	<1	<1	<1	<1	<1	
Apr 19	<1	<1	<1	<1	<1	<1	<1	
May 19	<1	<1	<1	<1	<1	<1	<1	
Jun 19	0	0	0	0	0	0	0	No sampling undertaken
Jul 19	<1	<1	<1	<1	<1	<1	<1	
Aug 19	<1	<1	<1	<1	<1	<1	<1	
Sept 19	<1	<1	<1	<1	<1	<1	<1	
Oct 19	<1	<1	<1	<1	<1	<1	<1	
Nov 19	<1	<1	<1	<1	<1	<1	<1	
Dec 19	<1	<1	<1	<1	<1	<1	<1	
Jan 20	<1	<1	<1	<1	<1	<1	<1	
Feb 20	<1	<1	2	<1	<1	<1	<1	
Mar 20	<1	<1	<1	2	4	20	<1	
Apr 20	<1	<1	<1	<1	<1	<1	<1	
May 20	<1	<1	<1	<1	<1	<1	<1	
Jun 20	<1	<1	<1	<1	<1	<1	<1	
Jul 20	<1	<1	<1	<1	<1	<1	<1	
Aug 20	<1	<1	<1	<1	<1	<1	<1	
Sept 20	<1	<1	<1	2	2	<1	<1	
Oct 20	<1	<1	<1	<1	<1	<1	<1	
Nov 20	<1	<1	<1	<1	<1	<1	<1	
Dec 20	<1	<1	<1	<1	<1	<1	<1	
Jan 21	<1	<1	56	<1	<1	<1	<1	
Feb 21	<1	<1	<1	~90	220	1	<1	
Mar 21	<1	<1	<1	<1	<1	***<1**	<1	***Sample taken at Racecourse**
Apr 21	0	0	0	0	0	0	0	
May 21	<1	<1	<1	<1	<1	<1	<1	

Jun 21	<1	<1	<1	<1	<1	<1	<1	
Jul 21	<1	<1	<1	<1	<1	<1	<1	
Aug 21	<1	<1	<1	<1	<1	<1	<1	
Sept 21	<1	<1	<1	<1	<1	<1	<1	
Oct 21	<1	<1	<1	<1	<1	<1	<1	
Nov 21	<1	<1	<1	<1	<1	<1	<1	
Dec 21	<1	<1	<1	<1	<1	*<1	<1	***Sample taken at Lions Park**
Jan 22	<1	<1	<1	~1	~2	<1	<1	
Feb 22	<1	26	<1	20	<1	***<1**	<1	***Sample taken at Racecourse**

Appendix D – Incident & Emergency Response Plan

Water Supply - Incident and Emergency Response Plan

Quality Information

Document	Water Supply - Incident and Emergency Response Plan
Doc. Ref No.	
Date	1 March 2022
Reviewed by	Environment & Regulatory Services Team Leader

Revision History

Revision	Revision Date	Details	Name/Position
0	5th September 2014		Matt Faichney AECOM
1	28th June 2016		Matt Faichney AECOM
2	22nd September 2017	September Revision of DWQMP	Megan Pellow Environmental & Regulatory Services Team Leader
3	16th December 2019	Regular Review	Megan Pellow Environmental & Regulatory Services Team Leader
4	1st March 2022	Regular Review	Megan Pellow Environmental & Regulatory Services Team Leader

Table of Contents

Executive Summary

An emergency response plan is required for the Drinking Water Quality Management Plan. The aim of this plan is to describe the current governance and coordination arrangements, and roles and responsibilities for emergency management.

This plan contains the information from each water supply system, the chain of command and the respective communication plan for each scheme. Information on incident and emergency levels, along with appropriate level and event specific actions are supplied, in order to ensure that any event likely to affect the McKinlay Shire Council water schemes has a set of management actions.

There is annexed to this document a *Boil Water Notice* that can be adapted to any water system if required.

1.0 Julia Creek

1.1 System information

System Identification	Julia Creek	
Basic Description and Location of System Facilities	Water supply from four (4) bores located in the town (Town, Tower, Lions and Scour) No treatment/ disinfection	
Population Served and Service Connections from Division of Drinking Water Records	511 EP	359 connections
Title, and Phone Number of Person Responsible for Maintaining and Implementing the Emergency Plan	Director of Engineering and Environmental Regulatory Services	Phone: (07) 4746 7166 Mobile: 0427 470 009

1.2 Chain of Command – Lines of Authority

Title	Responsibilities During an Emergency	Contact Numbers
Director of Engineering and Environmental Regulatory Services	***Emergency response lead*** Responsibility for evaluating incoming information, managing resources and staff, and deciding on appropriate response actions. This person is reachable 24 hours a day, seven days a week. ***Alternative water source*** Responsibility for arrange substitute water source if necessary—i.e., bottled water, bulk, etc.	Phone: (07) 4746 7166 Mobile: 0427 470 009
Environmental & Regulatory Services Team Leader	***Alternate Emergency response lead*** Assume the emergency response lead if the lead is unavailable.	Phone: (07) 4746 7166 Mobile: 0437 228 062
Environmental & Regulatory Services Team Leader	***Notify water system customers*** Responsibility for notifications (water shortage, water contamination, etc.)	Phone: (07) 4746 7166 Mobile: 0437 228 062
Water & Sewerage Officer	***Water sampling*** Responsibility for water sampling	Phone: (07) 4746 7166 Mobile: 0429 464 004

2.0 McKinlay

2.1 System information

System Identification	McKinlay	
Basic Description and Location of System Facilities	Water supply from two (2) bores located in the town Two (2) storage reservoirs – currently only 1 is connected to the reticulation No treatment/ disinfection	
Population Served and Service Connections from Division of Drinking Water Records	12 EP	56 connections
Title, and Phone Number of Person Responsible for Maintaining and Implementing the Emergency Plan	Director of Engineering and Environmental Regulatory Services	Phone: (07) 4746 7166 Mobile: 0427 470 009

2.2 Chain of Command – Lines of Authority

Title	Responsibilities During an Emergency	Contact Numbers
Director of Engineering and Environmental Regulatory Services	***Emergency response lead*** Responsibility for evaluating incoming information, managing resources and staff, and deciding on appropriate response actions. This person is reachable 24 hours a day, seven days a week. ***Alternative water source*** Responsibility for arrange substitute water source if necessary—i.e., bottled water, bulk, etc.	Phone: (07) 4746 7166 Mobile: 0427 470 009
Environmental & Regulatory Services Team Leader	***Alternate Emergency response lead*** Assume the emergency response lead if the lead is unavailable.	Phone: (07) 4746 7166 Mobile: 0437 228 062
Environmental & Regulatory Services Team Leader	***Notify water system customers*** Responsibility for notifications (water shortage, water contamination, etc.)	Phone: (07) 4746 7166 Phone: (07) 4746 4224
Water & Sewerage Officer	***Water sampling*** Responsibility for water sampling	Phone: (07) 4746 7166 Mobile: 0429 464 004

3.0 Kynuna

3.1 System information

System Identification	Kynuna	
Basic Description and Location of System Facilities	Water supply from one (1) bore with one backup bore located in the town Two (2) storage reservoir Pressure pump & filtration	
Population Served and Service Connections from Division of Drinking Water Records	14EP	35 connections
Title, and Phone Number of Person Responsible for Maintaining and Implementing the Emergency Plan	Director of Engineering and Environmental Regulatory Services	Phone: (07) 4746 7166 Mobile: 0427 470 009

3.2 Chain of Command – Lines of Authority

Title	Responsibilities During an Emergency	Contact Numbers
Director of Engineering and Environmental Regulatory Services	***Emergency response lead*** Responsibility for evaluating incoming information, managing resources and staff, and deciding on appropriate response actions. This person is reachable 24 hours a day, seven days a week. ***Alternative water source*** Responsibility for arrange substitute water source if necessary—i.e., bottled water, bulk, etc.	Phone: (07) 4746 7166 Mobile: 0427 470 009
Environmental & Regulatory Services Team Leader	***Alternate Emergency response lead*** Assume the emergency response lead if the lead is unavailable.	Phone: (07) 4746 7166 Mobile: 0437 228 062
Environmental & Regulatory Services Team Leader	***Notify water system customers*** Responsibility for notifications (water shortage, water contamination, etc.)	Phone: (07) 4746 7166 Phone: (07) 4746 4224
Water & Sewerage Officer	***Water sampling*** Responsibility for water sampling	Phone: (07) 4746 7166 Mobile: 0429 464 004

4.0 Nelia

4.1 System information

System Identification	Nelia	
Basic Description and Location of System Facilities	Water supply from one (1) bore located in the town No treatment/ disinfection	
Population Served and Service Connections from Division of Drinking Water Records	2 EP	8 connections
Title, and Phone Number of Person Responsible for Maintaining and Implementing the Emergency Plan	Director of Engineering and Environmental Regulatory Services	Phone: (07) 4746 7166 Mobile: 0427 470 009

4.2 Chain of Command – Lines of Authority

Title	Responsibilities During an Emergency	Contact Numbers
Director of Engineering and Environmental Regulatory Services	***Emergency response lead*** Responsibility for evaluating incoming information, managing resources and staff, and deciding on appropriate response actions. This person is reachable 24 hours a day, seven days a week. ***Alternative water source*** Responsibility for arrange substitute water source if necessary—i.e., bottled water, bulk, etc.	Phone: (07) 4746 7166 Mobile: 0427 470 009
Environmental & Regulatory Services Team Leader	***Alternate Emergency response lead*** Assume the emergency response lead if the lead is unavailable.	Phone: (07) 4746 7166 Mobile: 0437 228 062
Environmental & Regulatory Services Team Leader	***Notify water system customers*** Responsibility for notifications (water shortage, water contamination, etc.)	Phone: (07) 4746 7166 Phone: (07) 4746 4224
Water & Sewerage Officer	***Water sampling*** Responsibility for water sampling	Phone: (07) 4746 7166 Mobile: 0429 464 004

5.0 Emergency Response Actions

5.1 Incident / Emergency Response Actions

In the event of an incident or emergency, specific investigation and management actions should be taken, depending upon the severity of the incident / emergency. Table 1 outlines three incident / emergency levels that may be used to categorise events that affect the McKinlay Shire Council water schemes. Table 1 outlines the level specific actions that should be taken, along with the positions within McKinlay Shire Council responsible for taking specific actions. Note that the levels of E. coli detection that guide the severity of Incident / Emergency Level have been defined with guidance from the ADWG, which outlines that the infectious dose for EHEC may be as low as 10 to 100 organisms.

The response actions outlined in Table 1 are the critical overarching actions that must be taken in the event of an emergency, in order to ensure it is effectively managed and has as little impact on customers as possible. For event specific management actions, see Table 2, Section 5.2.

Table 1 Emergency Level Description and Management Actions

Incident / Emergency Level Level and Incident Description	Positions Responsible for Actions and Contact Details	Investigation and Management Actions (Summary of Actions to be Taken)
Major disaster or emergency, such as: – **Widespread outbreak of waterborne disease** – **Declared disaster** – **Localised emergency impacting on water quality (e.g. industrial spill, accidents)** – **Terrorist or deliberate contamination threat**	Emergency Response Lead (EML) - Director of Engineering and Environmental Regulatory Services Phone: (07) 4746 7166 Mobile: 0427 470 009 Environmental & Regulatory Services Team Leader - Alternate Emergency Response Lead (AEML) Phone: (07) 4746 7166 Mobile: 0437 228 062 Water & Sewerage Officer Phone: 0429 464 004 Other Council Staff as required External Agencies: DNR Queensland Health Queensland Police NATA Accredited Laboratory	– Report detection to WSR immediately by phone (**1300 596 709)** – Notify Council CEO and Internal Communications Department – Notify Police – Contact Queensland Health for assistance with contamination events – Isolate affected area (e.g. isolation valves, plugs, caps and seals and/or disengage supply pumps) – Potential action and control; Arrange alternative water sources, issue boil water alerts – Notify critical customers as per requirements under the MSC Incident and Emergency Response Plan – Coordinate community messaging by placing information on Notice Boards, Council Website and Council Facebook page – Investigate causes of contamination – Instigate remediation as per Council's policies and procedures – Notify all users when water supply is safe / supply is resumed – Review emergency/incident management procedures, their effectiveness, and lessons learned. Debrief staff on any issues. Review and update Incident and Emergency Response Plan as appropriate.

Incident / Emergency Level Level and Incident Description	Positions Responsible for Actions and Contact Details	Investigation and Management Actions (Summary of Actions to be Taken)
Event with a high risk of causing illness and/or affecting a large number of customers, such as: – Detection of E. coli in the reticulation system – Exceedance of ADWG health guideline value for a chemical parameter – Failure of infrastructure (severe or emergency level supply or supply disruption to over 50 customers for over 3 hours) through power outage, distribution line break, source pump failure etc. – An event that is likely to have resulted in the delivery of contaminated water to customers or where the delivery of contaminated water cannot be prevented e.g. backflow or back siphonage, flooding – Gross exceedance of ADWG health guideline values for a chemical parameter (value of exceedance is more than 5 times the ADWG health guideline limit).	Emergency Response Lead (EML) - Director of Engineering and Environmental Regulatory Services Phone: (07) 4746 7166 Mobile: 0427 470 009 Environmental & Regulatory Services Team Leader - Alternate Emergency Response Lead (AEML) Phone: (07) 4746 7166 Mobile: 0437 228 062 Water & Sewerage Officer Phone: 0429 464 004 Other Council Staff as required External Agencies: DNR Queensland Health Queensland Police NATA Accredited Laboratory	– Report detection to WSR immediately by phone (**1300 596 709)** – Notify Council CEO – Commence investigation to determine cause – Arrange for re-samples to be taken where required – Isolate affected area (e.g. isolation valves, plugs, caps and seals and/or disengage supply pumps) – Review associated laboratory reports and operational records – Potential action and control; Arrange alternative water sources, issue boil water alerts – Notify critical customers as per requirements under the MSC Incident and Emergency Response Plan – Coordinate community messaging by placing information on Notice Boards, Council Website and Council Facebook page – Investigate causes of contamination – Instigate remediation as per Council's policies and procedures – Review emergency/incident management procedures, their effectiveness, and lessons learned. Debrief staff on any issues. Review and update Incident and Emergency Response Plan as appropriate. – Notify all users when water supply is safe / supply is resumed. – Review emergency/incident management procedures, their effectiveness, and lessons learned. Debrief staff on any issues. Review and update Incident and Emergency Response Plan as appropriate.
Exceedance of ADWG aesthetic limit, for example turbidity, colour, Sodium levels or PH Increased concentration of Total Coliforms	Emergency Response Lead (EML) - Director of Engineering and Environmental Regulatory Services Phone: (07) 4746 7166 Mobile: 0427 470 009 Environmental & Regulatory Services Team Leader - Alternate Emergency Response Lead (AEML) Phone: (07) 4746 7166 Mobile: 0437 228 062 Water & Sewerage Officer Phone: 0429 464 004 Other Council Staff as required External Agencies: NATA Accredited Laboratory	– Contact MSC internal management – Consider flushing and / or disinfecting the distribution pipes as per the Distribution System Maintenance Procedure – Consider organising repeat water quality sampling.

5.2 Response Actions for Specific Events

The first step in the event of an incident or emergency is to identify the incident / emergency level. However, the Emergency Response Lead may need help identifying the correct emergency / incident level for the specific event. Table 2 may assist the Emergency Response Lead in identifying the level of the emergency, according to the hazard associated with the event.

Table 2 also outlines the appropriate event specific McKinlay Shire Council procedures to follow during the management of an incident / emergency, based upon events that are likely to affect the McKinlay Shire Council water schemes, according to the Risk Hazard Assessment in Appendix E of the McKinlay Shire Council Drinking Water Quality Management Plan.

Table 2 Event Specific Emergency Management Actions

Event Description	Associated Hazard	Likely Emergency Level/s	Chance of Affecting Scheme				Event Specific Management Actions (to be Coordinated by Emergency Response Lead)
			Julia Creek	McKinlay	Kynuna	Nelia	
Bore head or reservoir damage	Damaged infrastructure Interrupted Supply	1, 2, 3	Low	Low	Low	Low	Follow management actions in Table 1 according to level of emergency Isolate supply for repair and notify all users if the service will be interrupted. Repair bore heads or reservoirs in accordance with the Reservoir Integrity and Bore Head Maintenance Procedure Flush affected area as per the Mains Flushing Procedure
Microbial (coliform, *E. coli*) contamination	Contamination	1,2	Low	Med	Med	Low	Follow management actions in Table 1. Report detection immediately to WSR by phone (**1300 596 709)** Issue boil water, do not drink alerts (template Appendix A) and arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc. Flush affected area as per the Mains Flushing Procedure
Backflow or back siphonage	Contamination	2	Low	Low	Low	Low	Follow management actions in Table 1 according to level of emergency Report incident immediately to WSR by phone. Issue boil water, do not drink alerts (template Appendix A) and arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc. Flush affected area as per the Mains Flushing Procedure.
Flooding	Contamination	1	Med	Low	Low	Med	Follow management actions in Table 1 according to level of emergency Issue boil water, do not drink alerts (template Appendix A) and arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc. Notify all users regarding the potential for water contamination, loss of pump, power, etc. Users should be advised to store some drinking water in advance and to boil any suspect water for two minutes or disinfect with chlorine when flood conditions exist. Arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc.
Power outage	Interrupted service	2,3	Low	Low	Low	N/A	Follow management actions in Table 1 according to level of emergency Flush affected area as per the Mains Flushing Procedure Run backup generator

Event Description	Associated Hazard	Likely Emergency Level/s	Chance of Affecting Scheme				Event Specific Management Actions (to be Coordinated by Emergency Response Lead)
			Julia Creek	McKinlay	Kynuna	Nelia	
							Ensure pump is shut off if backup generator is not available (to protect pump). Arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc.
Distribution line break	Contamination Interrupted service Damaged Infrastructure	2	Low	Low	Low	Low	Follow management actions in Table 1 according to level of emergency Reduce pressure (but maintain enough pressure to prevent backflow). Repair pipes in accordance with the Water Mains Repair Procedure Arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc. Flush pipes after interruption of service.
Source pump failure	Interrupted service	3	Low	Low	Low	N/A	Follow management actions in Table 1 according to level of emergency Notify all users if the service will be interrupted. Arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc. Flush pipes after interruption of service.
Chemical contamination	Contamination	1,2	Low	Low	Low	Low	Follow management actions in Table 1 according to level of emergency Shut down pump at affected area. Issue boil water; do not drink alerts (template Appendix H.7). Contact local media for public service announcement (where all customers cannot be notified by phone). Arrange alternate source if necessary—i.e., bottled water, bulk hauler, storage tank. Contact Queensland Health and SES for advice and assistance in identifying the chemical(s) compound(s) if unknown, along with identifying appropriate testing procedures. Proceed to water sampling and testing in accordance with the sampling procedure Water & Sewerage Officer to check the sampling procedures for different types of contaminants; obtain sample containers; check the volume of required samples; identify who is responsible for taking samples; identify who is responsible for transporting samples (in time sensitive situations); confirm laboratory capabilities and certifications; and interpret results.
Vandalism	Damage Interrupted service Contamination	1,2	Low	Low	Low	Low	Follow management actions in Table 1 according to level of emergency Notify all users and issue do not drink alerts Arrange alternate source if necessary—i.e., bottled water, bulk hauler, storage tank.
Reduction or loss of water in the bore	No water	3	Low	Low	Low	Low	Follow management actions in Table 1 according to level of emergency Shut down pump.

Event Description	Associated Hazard	Likely Emergency Level/s	Chance of Affecting Scheme				Event Specific Management Actions (to be Coordinated by Emergency Response Lead)
			Julia Creek	McKinlay	Kynuna	Nelia	
							Notify all users if the service will be interrupted. Arrange alternate source if necessary—i.e. bottled water, bulk hauler, etc. Proceed engineering and/or geological investigation.
Hazardous materials spill in vicinity of sources or system lines	Contamination Interrupted service	1	Low	Low	Low	Low	Follow management actions in Table 1 according to level of emergency Shut down pump at affected area. Issue boil water, do not drink alerts Contact local media for public service announcement (where all customers cannot be notified by phone). Arrange alternate source if necessary—i.e., bottled water, bulk hauler, storage tank. Contact Queensland Health and SES for advice and assistance in identifying the chemical(s) compound(s) if unknown, along with identifying appropriate testing procedures. Proceed to water sampling and testing in accordance with the sampling procedure. Water & Sewerage Officer to check the sampling procedures for different types of contaminants; obtain sample containers; check the volume of required samples; identify who is responsible for taking samples; identify who is responsible for transporting samples (in time sensitive situations); confirm laboratory capabilities and certifications; and interpret results.

6.0 Julia Creek Communication Plan

Appropriate and timely communication is essential during an emergency. The person responsible for notifications will contact primarily the following list to ensure that all appropriate first responders and affected customers or critical users are notified. List should be updated as necessary.

External Notification List – Critical users

Local	Name and Title	Contact Numbers Email
Julia Creek Hospital/Medical Centre	Administration Officer	(07) 4746 4000
Julia Creek Early Learning Centre	Director	(07) 4746 7279 jckkindy@mckinlay.qld.gov.au
Julia Creek State School	Principal	(07) 4746 4444 the.principal@julicreess.eq.edu.au

Following the critical user communication, all users should be contacted. The contact list above is to help in the dissemination of information.

External Notification List – All users

Local	Name and Title	Contact Numbers Email
Julia Creek Information Centre “At the Creek”	Tourism Officer	(07) 4746 7690 tourism@mckinlay.qld.gov.au
Julia Creek Caravan Park	Managers	(07) 4746 7108 jccaravanpark@mckinlay.qld.gov.au
Julia Creek Hotel	Managers	(07) 4746 7727
Gannon’s Hotel Motel	Peter Hayden, Owner	(07) 4746 7103
Julia Creek Villas	Managers	(07) 4746 7468
Julia Creek Motel	Scott & Michelle Zadow Owners	(07) 4746 7305 juliacreekmotel@bigpond.com
Julia Creek Foodmart	Phillip & Wendy Alexander Owner	(07) 4746 7193 philalexander@bigpond.com
Godiers Supermarket	Stephen and Linda Malone Owners	(07) 4746 7201 malone46@bigpond.net.au
Julia Creek Police	Officer in Charge	(07) 4744 1622
Julia Creek Ambulance	Officer in Charge	(07) 4746 7101

In addition, a notice can be printed and divulged through the community. Appendix A contains an example of bacterial water contamination notice.

7.0 McKinlay Communication Plan

Appropriate and timely communication is essential during an emergency. The person responsible for notifications will contact primarily the following list to ensure that all appropriate first responders and affected customers or critical users are notified. List should be updated as necessary.

External Notification List – Critical users

Local	Name and Title	Contact Numbers Email
McKinlay Bush Nurse	Nurse on Duty	(07) 4746 8505 Mckinlay.don@health.qld.gov.au
Walkabout Creek Hotel	Frank & Debra Wust, Owners	(07) 4746 8424 walkaboutcreekhotel@bigpond.com
McKinlay Police	Officer in Charge	(07) 4746 8420 Collis.AnneC@police.qld.gov.au

Following the critical user communication, all users should be contacted. The contact list above is to help in the dissemination of information.

External Notification List – All users

Local	Name and Title	Contact Numbers Email
McKinlay Library	Librarian	(07) 4746 8848
McKinlay Works Depot	James Mathison	0437 896 811

In addition, a notice can be printed and divulged through the community. Appendix A contains an example of bacterial water contamination notice.

8.0 Kynuna Communication Plan

Appropriate and timely communication is essential during an emergency. The person responsible for notifications will contact primarily the following list to ensure that all appropriate first responders and affected customers or critical users are notified. List should be updated as necessary.

External Notification List – Critical users

Local	Name and Title	Contact Numbers Email
Kynuna Roadhouse	Jeffery Lawson / Adriana Haley Owners	(07) 4746 8683
Blue Heeler Hotel	Manager	(07) 4746 8650 blueheelerhotel@activ8.net.au
Kynuna Police	Officer in Charge	(07) 4746 8777

Following the critical user communication, all users should be contacted. The contact list above is to help in the dissemination of information.

External Notification List – All users

Local	Name and Title	Contact Numbers Email

In addition, a notice can be printed and divulged through the community. Appendix A contains an example of bacterial water contamination notice.

9.0 Nelia Communication Plan

Appropriate and timely communication is essential during an emergency. The person responsible for notifications will contact primarily the following list to ensure that all appropriate first responders and affected customers or critical users are notified. List should be updated as necessary.

External Notification List – Critical users

Local	Name and Title	Contact Numbers Email
Resident	Georgina Westland & Eric Alloway	(07) 4746 7555

Following the critical user communication, all users should be contacted. The contact list above is to help in the dissemination of information.

External Notification List – All users

Local	Name and Title	Contact Numbers Email

In addition, a notice can be printed and divulged through the community. Appendix A contains an example of bacterial water contamination notice.

10.0 Plan Approval

This plan is officially in effect when reviewed, approved, and signed by the following people

Name/Title	Signature	Date
Des Niesler Chief Executive Officer McKinlay Shire Council		17/12/19

Appendix A Example of Boil Water Notice

Appendix A Example of Boil Water NoticeExample of Boil Water Notice

BOIL WATER ALERT FOR IMMEDIATE RELEASE

BOIL WATER BEFORE USE

McKinlay Shire Council advises all residents of **.....** to boil tap water used for drinking following a positive reading of *Escherichia coli (E.coli)* affecting the .... *Township.*

This alert applies to all residents in the township of ..... from **.....** **until further notice.**

McKinlay Shire Council is working *closely with Queensland Health* to resolve the situation.

McKinlay Shire Council is working at identifying and rectifying this issue as soon as possible and apologise for the inconvenience. Council are currently undertaking chlorination, flushing and re-sampling of the system. This whole process may take approximately 2 weeks.

The boil water alert will stay in effect until McKinlay Shire Council and Queensland Health are confident there is no longer a public health concern. Regular updates will be provided to the affected community.
Consuming unboiled drinking water could lead to illness, especially for vulnerable people (e.g. those who are very young, elderly or those with weak immune systems). If you believe the water has made you sick, contact 13 HEALTH (13 43 25 84), your local doctor or local hospital and advise them of your concerns.

People should use cooled boiled water or bottled water for:
- drinking
- brushing teeth
- preparing and cooking foods
- washing raw foods such as fruit and vegetables
- preparing beverages and making ice
- preparing baby formula
- sponge-bathing infants.

Unboiled drinking water can be used for:
- showering and bathing other than infants (avoid getting water in the mouth)
- washing dishes by hand or in a dishwasher
- washing clothes
- flushing toilets.

People should bring drinking water to a rolling boil and then allow water to cool before using it or storing it in a clean, closed container for later use.
Kettles with automatic cut-off switches are suitable for producing boiled water. Variable temperature kettles should be set to boil.
Residents are urged to share this alert with neighbours and friends.
For more information, please do not hesitate to contact Council on (07) 4746 7166.

Chief Executive Officer
McKinlay Shire Council

Appendix E – Sampling Location

Water Sampling Locations – Julia Creek

Water Sampling Locations - McKinlay

Water Sampling Locations – Kynuna

Water Sampling Locations – Nelia

Appendix F – Drinking Water Quality Policy

DRINKING WATER QUALITY POLICY

1. Policy Purpose/Intent

To implement and maintain drinking water quality to the townships of Julia Creek, Kynuna, McKinlay and Nelia with minimum or nil risks in accordance with Council's Drinking Water Quality Management Plan (DWQMP) and the Australian Drinking Water Guidelines (ADWG).

2. Authority (Legislation)

- *Australian Drinking Water Guidelines*
- *Water Act 2000*
- *Water Supply (Safety and Reliability) Act 2008*
- *Plumbing and Drainage Act 2018*
- *Plumbing and Drainage Regulation 2019*
- *Public Health Act 2005*
- *Public Health Regulation 2018*
- *Work Health and Safety Act 2011*
- *Work Health and Safety Regulation 2011*

3. Scope

This policy applies to all McKinlay Shire Council activities associated with the supply of safe drinking water to its communities.
The Policy also pertains to all support, operational, and management personnel involved in the provision of potable drinking water and its associated infrastructure.

4. Policy Statement

McKinlay Shire Council is committed to managing its drinking water supply schemes to provide safe drinking water to the McKinlay Shire community that meets the National Health and Medical Research Council (NHMRC) / National Resource Management Ministerial Council Australia (NRMMC) Australian Drinking Water Quality Guidelines.

To achieve this Council will:

- Ensure the operation and maintenance of safe drinking water in accordance with McKinlay Shire Council's DWQMP and the guidelines.
- Use the risk-based approach to identify and manage environmental hazards or hazardous activities within its drinking water quality management.
- Undertake monitoring of the drinking water quality as per Council's DWQMP to ensure safe drinking water.

- Continually strive to improve procedures and performance within the Drinking Water Quality Management System, reviewing our practices against industry standards and expectations of our stakeholders.
- Incorporate the needs and expectations of our consumers, stakeholders, regulators, and employees into drinking water quality management.
- Strive to maintain compliance with all relevant environmental legislation, codes of practice and our Information Notices.
- Ensure all employees are appropriately trained within their area of responsibility and are aware of their obligations
- Develop the appropriate capabilities needed for contingency planning and incident response.
- Undertake regular monitoring of drinking water quality, develop, and maintain effective reporting mechanisms to provide relevant and timely information and promote confidence in the management of MSC's water supply systems.
- Participate in appropriate research and development opportunities to improve our understanding of drinking water quality issues and performance.

5. Responsibility

McKinlay Shire Council is responsible for the adoption, amendment and repeal of this Policy, and the Chief Executive Officer and his delegates is responsible for the development and amendment of any associated procedures and guidelines relevant to the Policy.

6. Review

It is the responsibility of the Director of Engineering and Environmental Regulatory Services to monitor the adequacy of this policy and recommend appropriate changes.

This policy will be formally reviewed every three years or as required by Council.

This Policy is to remain in force until otherwise amended/repealed by resolution of Council.

Appendix G – Customer Services Standards

CUSTOMER SERVICE STANDARD

Service Connections – New and Replacement

Council utilises the Australian Standards as reference for the renewal, replacement and new connections of water services to the properties to be serviced from the potable water networks.

To undertake application for a new or replacement service please contact Council's Reception and complete a customer request form.

Council supplies a single connection point for each property as per the Australian Standard, Council's responsibility for both water and sewerage ceases at the boundary of the property.

Combined connections are the exception; Council has a responsibility for drainage that passes through a third party property. Existing services may be altered or modified by application to Council and undertaken by an appropriate licenced contractor once approval is given.

Water Meters

Water meters are currently not required for domestic properties within the McKinlay Shire. Meters may be required on some commercial premises and installed in consultation with the customer.

Availability of Services

Council's Water and Wastewater Networks are available for use 24 hours a day/7 days a week.

The Council's Networks are multi faceted systems that may require emergency maintenance, operational maintenance resulting in loss of supply/service. Council endeavours to fully inform its customers and residents of interruptions affecting its networks.

Network Conditions

Council requests that its customers and residents report any damage or suspected damage to Council's infrastructure.

Council operates a closed potable water system and for this reason any damage to its networks can lead to contamination affecting the operational serviceability and potentially increasing the risk to Public Health.

It is the responsibility of all users to help maintain the networks to minimise the risks associated with contamination.

Council believes its customers will exercise a duty of care by reporting any damage whether deliberate, accidental or beyond its service life to the Council via Council's Reception.

Entry to Private Property

Council's Authorised Persons in certain circumstances may be required to access Councils Networks within your property. Council obtains this authority via *Local Government Act 2009, Water Supply Act, Plumbers and Drainage Act, Planning Act 2016 and the Public Health Act* and their regulations.

In most cases Council will undertake notification of its right to enter with the resident, this cannot be applied in case of emergency works. Council will endeavour to fully inform the resident during any periods where entry is required.

Rates Fees and Charges

Water

Council applies an annual water charge for each property in lieu of a user pays metered system. Additional works required on Council's network for private works will be charged at a 'at cost' rate or as subject to Council's Fees and Charges.

Sewerage

Council applies an annual sewerage connection and services charge for each property connected or with the potential to connect to its network.

Additional works required on Council's network for private works will be charged at a 'at cost' rate or as subject to Council's Fees and Charges.

COMPLAINTS AND DISPUTE RESOLUTION

Council has procedures and policies for the operation and service standards of its networks. Lodgement of complaints or concerns can be made via contacting Council's Reception in the following formats;

- Phone
- Email
- Post

CUSTOMER CONSULTATION

Council undertakes a consultation with its communities throughout the year and it is via locational visitation with its residents that network concerns, future planning and community requests can be made.

Information obtained from community consultations will be included in the services asset management plans and capital works programs.

McKinlay Shire Contact Details

29 Burke St
Julia Creek, Qld 4823
Opening Hours:
Monday to Friday – 8:30am to 5pm
PO Box 177, Julia Creek Q 4823
Phone (07) 4746 7166
reception@mckinlay.qld.gov.au
www.mckinlay.qld.gov.au