Napranum

Aboriginal Shire Council

Drinking Water Quality Management Plan

AUGUST 2016

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Napranum Aboriginal Shire Council

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Document Status					
Date	Revision	Description	Author	Checked	Approved
	1	For review			
	2	For review incor ɔorating reviewers comm ɔnts			

	3	Incorporating preliminary comments from OWSR			
	4	Board approval for submission to OWSR			

Napranum Aboriginal Shire Council
Drinking Water Quality Management Plan

1 Registered Service Details

Drinking water service provider	**SPID**
Napranum Aboriginal Shire Council	**144**

Drinking water scheme

Napranum

Contact person	**Position**
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1.1 Listing of drinking water supplies

Scheme name	Operator	Communities served	Current			Projected in 10 years		
			Population	Connections	Demand ML/d	Population	Connections	Demand ML/d
Napranum	Napranum Aboriginal Shire Council	Napranum	1168	255	1.16	1500	300	1.8

2 Details of Infrastructure

2.1 Schematics

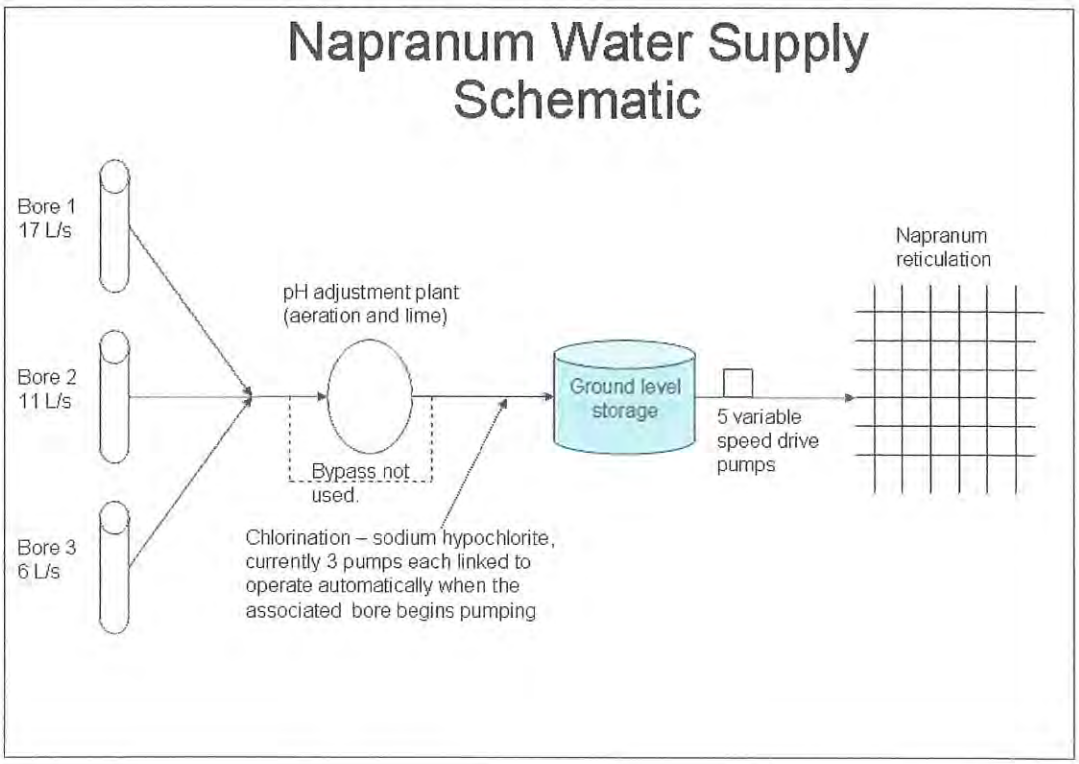


Figure 1: Schematic for Napranum Water scheme

Infrastructure details

The Napranum water supply is currently being upgraded through DLGP, and there are a number of commissioning issues that have not yet been resolved. Napranum Aboriginal Council is not taking possession of the upgraded water treatment plant until such time as all issues are resolved. Therefore, at this time Council does not own the infrastructure, and only operates the plant as the contractor is no longer operating as per their contract.

2.2 Sources

The bulk water supply for Napranum is primarily drawn from two bores (M1 and M2) installed in the late1960s and located within the water yard. A third bore (M3), located between the rangers shed and the tennis courts, was drilled in 1998 to supplement the community's water supply. This bore is subject to the current upgrade, and is expected to be able t\o yield close to 1 ML /day following the upgrade.

Main supply

	Bore 1 (M1)	**Bore 2 (M2)**	**Bore 3 (M3)**
Aquifer type	Unconfined	Unconfined	Unconfined
Yield	1.5 ML/day	0.95 ML/day	0.5 ML/ day

Reliability	17 L/s Excellent - 2013, still had 6m water head at end of dry	11 L/s Excellent - dry in 2013, still had 6m water head	6 L/s Subject to upgrade
Pump type	Grunfos 60.4	Grunfos60.4	Grunfos 40
Capacity	XXm³/hr	s XXm³/hr	XXm³/hr
Bore depth (m)	19 Meters	19 Meters	19 m
Bore head details	Elevated, no ingress, capped	Elevated, no ingress, capped	Elevated, no ingress, capped
Casing and material	PVC	PVC	PVC
Water quality issues	Low pH (4.8 to 6)	Low pH (4.8 to 6)	Low pH (4.8 to 6)

2.2.1 Treatment

Low pH water from the 3 bores (usually only Bore 1 and 2 are in use, either separately, or in tandem) is pumped through a single pipe to an aerator/ lime pH adjustment plant. Water enters the top, and flows down through 9 plates that allow aeration, before passing through a lime bed. The resulting pH is too high, and needs to be blended with raw water to achieve a pH of 6.4 to 7.2. The mixing ratio is set manually on a daily basis. This currently causes issues as it each bore has a separate pH, and the required ratio changes each time that the source selection changes (automatic based on usage)

Following pH adjustment, water is dosed with sodium hypochlorite solution for disinfection.

Name	pH correction / aeration
Process	Lime
Design capacity	Pumps 60 L/s
Chemicals added	Aeration trays and lime
Bypass / variation	Yes can by-pass. Not used.

2.2.2 Disinfection

Summary: Disinfection pumps (3 of, one linked to each bore) are operated automatically when the associated bore is switched on. Disinfected water flows into the ground level tank. Dosing rates are currently being reassessed, with the aim of ensuring 0.5 mg/L at the Tavern (located on a dead end line).	
Location	At water treatment plant (chlorine shed) prior to reservoirs
Type	Injection on outlet side of pH correction, prior to ground level tank
Chlorine storage and turnover	Sodium hypochlorite

Target residual level	1 to 3 mg/L
Duty / standby	3 pumps (1 per bore – no redundancy currently)
Dosing arrangement	Fixed – pumps start and stop when bore pumps operate.
Alarms	Not currently. Currently daily testing of chlorine is done in 4 locations

2.2.3 Reservoirs

Name	Ground Level Reservoir
Capacity	1 ML
Roofed	Yes
Vermin-proof	Yes
Runoff from roof	Directed away, opening on top has raised lip which is then securely covered.
Cleaning	Yearly
Filling	Bore pumps are triggered by a float valve. Usually kept close to full. E.g. when reservoir is 4/5 capacity, bores commence pumping.

2.2.4 Distribution and Reticulation

Pipe material(s)	Reticulation is thought to have been mostly replaced with uPVC, however, the replacement has been ad hoc, so there may be old sections remaining.
Age range	Uncertain – 1960s onwards.
Length of mains	8.5 km
Issues with long detection and dead ends	2 dead ends – Tavern (low point), Bee-ning Rd (high point)
High pressure issues	No – operated at 260 kPa (pressure reducing valves in several locations)
Low pressure issues	No
Number of pump stations	5 pumps (VSD)
Flushing	Monthly (or based on chlorine residual at Tavern/ incident response)

2.3 Key Stakeholders

Organisation	Relevance to management of drinking water quality	How the stakeholders is engaged in the DWQMP
Napranum community	Consumers or customers	Informed of water quality issues
Coogee Chemicals 39070400	Good quality chemicals, availability and supply of stock	Arrangement with Pumps & Irrigation (Mareeba)
Ergon 1800707633	For pumping water from bore fields	Maintaining continuity of power
QWSR, DEWS	Regulator 1300 596 709	Consulted during development of DWQMP, water quality incidents reported to QWSR
Council	Overall management, budget and finances	Informed of water quality issues
Hospital (clinic)40697459	Consumer	Informed of water quality issues
Aged Care 40697055	Consumer	Informed of water quality issues
School and Preschool 40697336	Consumer	Informed of water quality issues
Shop	Makes water drinks	Informed of water quality issues

3 Identify Hazards and Hazardous Events

Microbiological – potential

	Class of Hazard	Hazard	Hazardous Event	
			What	Where
Catchment	*Biological*	*Bacteria*	*Sewerage leakage*	*Sewer system*
		Virus	*Sewerage leakage*	*Sewer system*
		Protozoa	*Sewerage leakage*	*Sewer system*
	Physical	*pH*	*Low pH source*	*Catchment*
	Chemical	*Nil*	*Nil identified*	
Water Treatment Plant	*Biological*	*Ineffective disinfection*	*Underdosing*	*WTP*
	Chemical	*Chlorine*	*Overdosing*	*WTP*
		Ineffective disinfection (pH)	*pH adjustment >8.5*	*WTP*
Reticulation	*Physical*	*AC piping ageing*	*Breaks impact water supply*	*reticulation*
	Biological	*Backflow*	*Contaminated water*	*reticulation*
		contamination	*Mains breaks*	*reticulation*
Whole of System		*Power Supply / bore pumps*	*Loss of supply*	*WOS*
		Staffing	*Loss of knowledge*	*WOS*
		Record keeping	*Old system*	*WOS*
		Vandalism		*WOS*
		Availability of spares	*Failure of treatment/ delivery infrastructure*	*WOS*
		Switchboard	*Lightning*	*WOS*
		Few written procedures	*System wide*	*WOS*

3.1 Water Quality and Catchment Information

3.1.2 Treated water (treatment plant outlet)

There is virtually no record of treated water quality. For example, free chlorine has only been measured for the past 2 weeks, and target levels are still being set. There has been monthly *E. coli* monitoring for the past 12 months, but records prior to this time are sporadic or non-existent.

3.1.3 Incident History

There have been a few issues at Napranum, including loss of supply and *E. coli* detections. The loss of supply resulted when one bore was being repaired, and the bore pump on the service bore apparently failed. However, it is now believed that the 3 day outage could have been prevented had the operators at the time understood the system (the fault was electrical, and could have been resolved simply).

E. coli has been detected at:
Napranum School 5 cfu/100 mL, Overhead tank, 3 cfu/100 mL and Napranum Hospital 1 cfu/100 mL on 19/2/2013 Council consulted with Department of Health and issued a Boil Water Alert. Chlorination increased. Hospital 1 cfu/100 mL on 10/12/2012
Napranum School 1 CFU/100 mL 11/9/2012. In all cases chlorination was either not operational, or at very low levels.

Snapshot Monitoring (September 2011)

Client Reference	ANIONS	Chlorate by IC mg/L	Bromate by IC mg/L	METALS	Aluminium mg/L	Antimony mg/L	Arsenic mg/L	Barium mg/L	Beryllium mg/L	Boron mg/L	Cadmium mg/L	Chromium mg/L	Cobalt mg/L	Copper mg/L	Iron mg/L	Lead mg/L	Manganese mg/L	Molybdenum mg/L
		0.8	0.02		0.2	0.003	0.01	2	0.06	4	0.002	0.05		2	0.3	0.01	0.5	0.05
NAP1					0.005			0.001		0.009			< 0.0001	0.005		0.0004		

Nickel mg/L	Selenium mg/L	Silver mg/L	Uranium mg/L	Vanadium mg/L	Zinc mg/L
0.02	0.01	0.1	0.017		3
				< 0.0001	0.001

SWA	Conductivity uS/cm	pH	Temperature deg C	Total Hardness mg/L as CaCO3	Temporary Hardness mg/L as CaCo3	Alkalinity mg/L CaCo3	Residual Alkalinity meq/L	Silica mg/L	Total Dissolved Ions mg/L	Total Dissolved Solids mg/L	True Colour Hazen	Turbidity NTU	pH (Saturation)*	Saturation Index	Mole Ratio	Sodium Absorption Ratio	Figure of Merit
		6.5-8.5						80		600	15	5					
			22				0.1					<1		-5.6			

Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Chloride mg/L	Fluoride mg/L	Nitrate mg/L	Sulphate mg/L	Iron mg/L	Mangane se mg/L	Zinc mg/L	Aluminium mg/L	Boron mg/L	Copper mg/L	Sodium mg/L	Potassium mg/L	Calcium mg/L	Magnesium mg/L
			250	1.5	50	500	0.3	0.5	3	0.2	4	2	180			
	0	0	3.4	< 0.1	1	< 1	<0.01	<0.01		<0.05						

No water quality issues other than low pH were identified as a result of the snapshot monitoring undertaken. However, it would be beneficial to get more data (wet and dry season to determine any changes in water quality over these times).

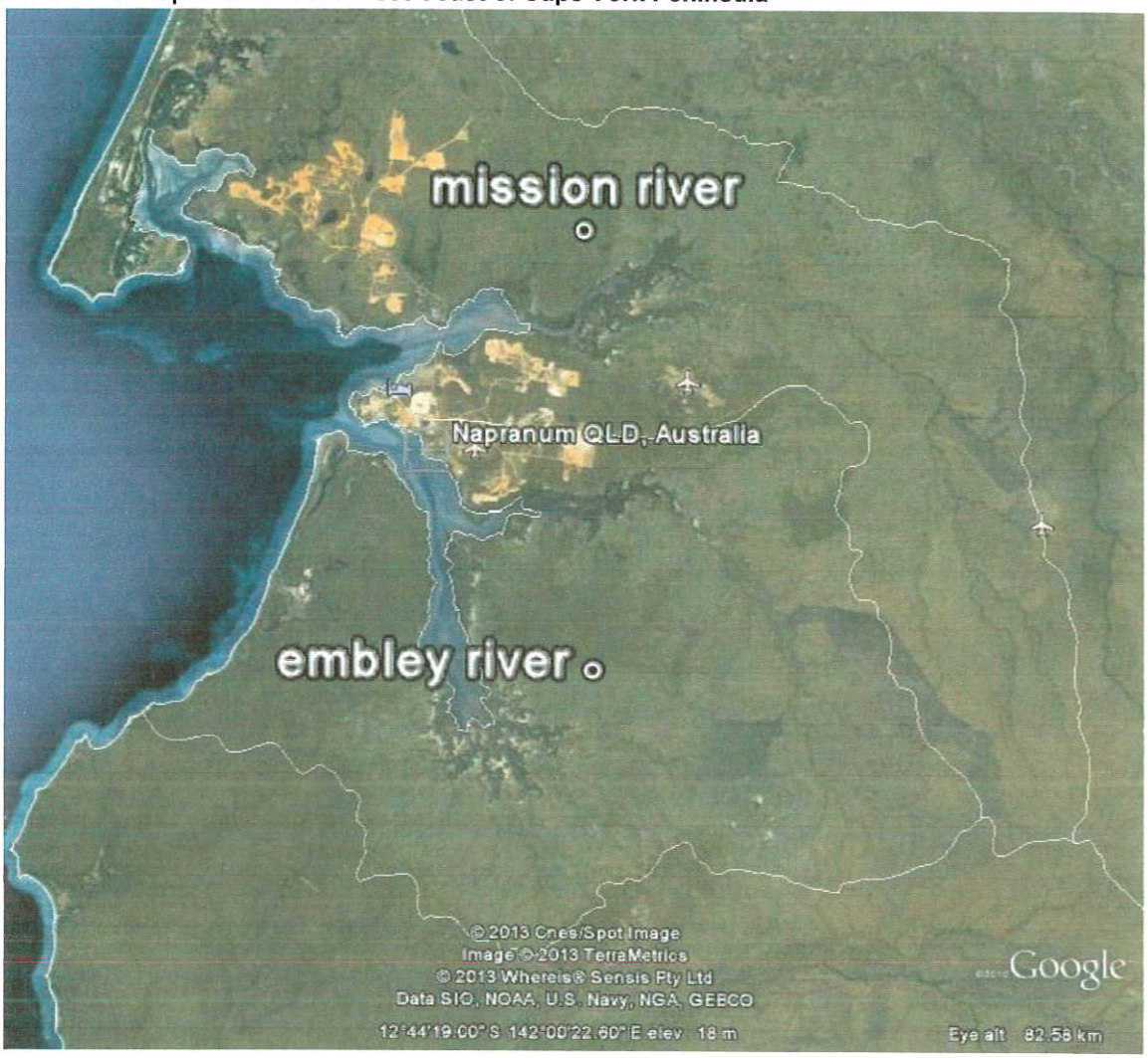
3.2 Catchment Characteristics

3.2.2 Summary Description

The Napranum Aboriginal Shire Council Local Government area is situated in a coastal area of the western Cape York in far north Queensland approximately 5 km south of Weipa.

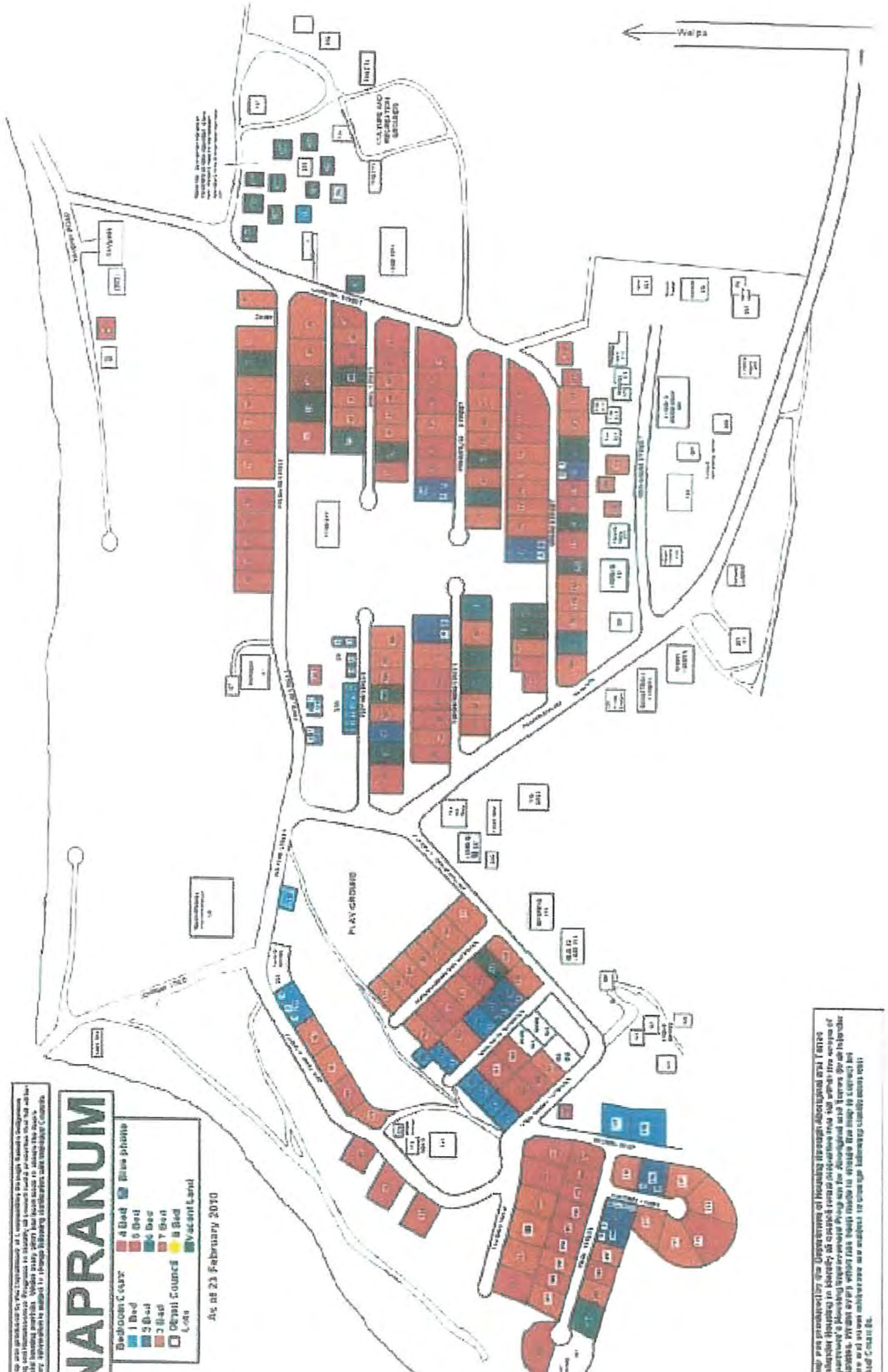
Water is sourced from a shallow aquifer in the Embley River catchment that drains through bauxite. The aquifer details are not well known. However, it is accepted that the aquifer has rapid connectivity to the surface, and there is potential for surface contamination. Bore water levels have been observed to increase within 2 days of heavy rainfall. However, water quality has not been observed to change (but there is no chemical data to back up this observation). The bore currently extract water from 18 m depth, and water level ranges from 5 m under the surface (wet season) down to 13 m (2013 prior to the commencement of the wet – a very dry season). The bores consistently produce water at the flow rates identified, and are considered to be very reliable. Nonetheless, with the current population projections, there will be a need to upgrade to meet demand over 10 years.

Location of Napranum on the West Coast of Cape York Peninsula



Location of Napranum (South East of Weipa) in the Embley River Catchment.

Napranum Town Site Plan



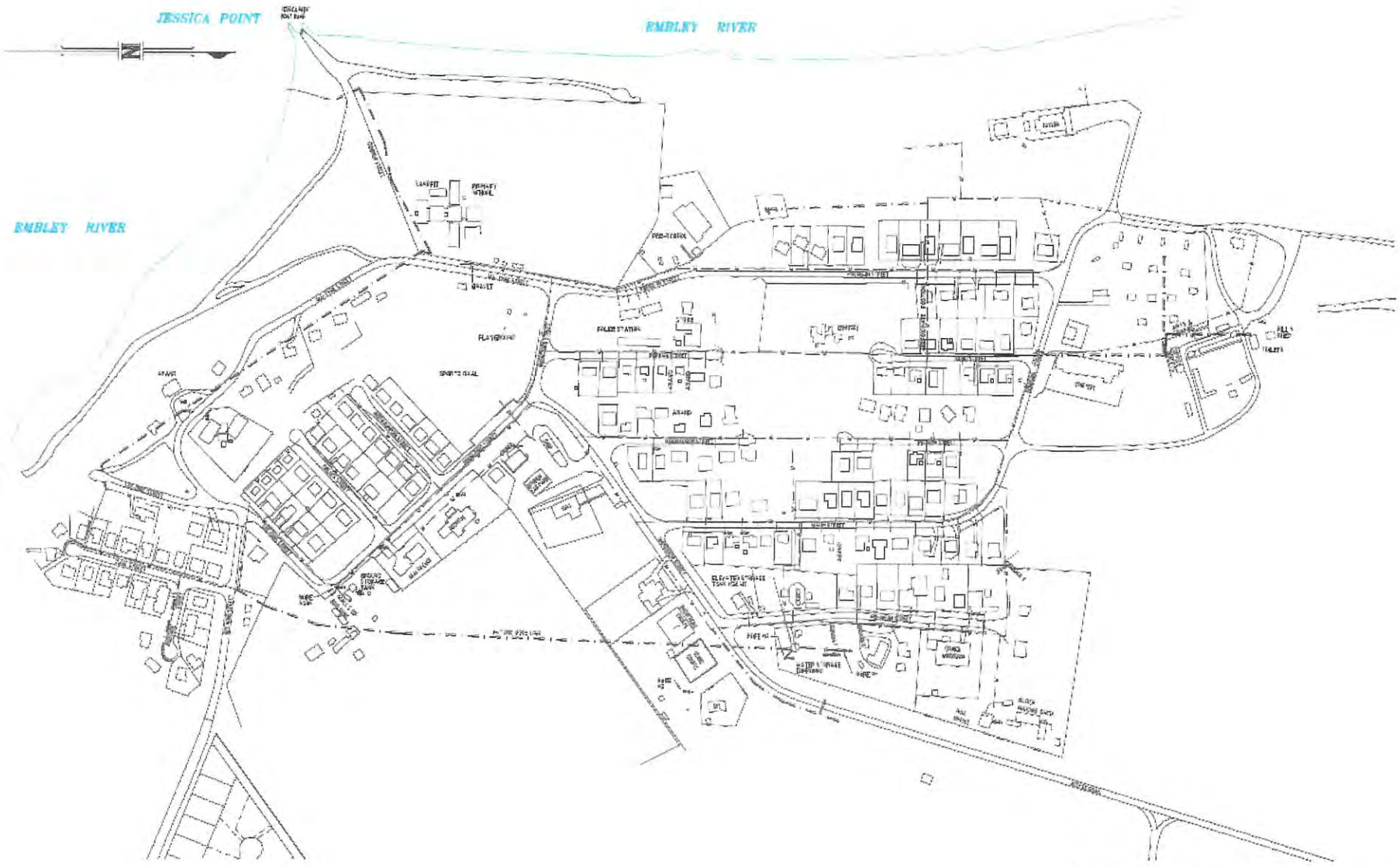

JESSICA POINT
EMBLEY RIVER
EMBLEY RIVER
N
LEGEND
EXISTING UNDERGROUND WATER MAIN
EXISTING ABOVE GROUND WATER MAIN
EXISTING IRRIGATION MAIN
PROPOSED WATER MAIN
0 40 80 120 160 200 240 280 320m
(1:4000for A3 Size Plot)
NAPRANUM COMMUNITY
TMP UPDATE 2000 – 2010
WATER SUPPLY LAYOUT
JUNE 2000
FIGURE 1

Table 3.3 Catchment Characteristics

Characteristics	Details
Area	Unknown (aquifer)
Topography	Mostly flat and swampy surrounding Napranum – hills rise to the East of the catchment.
Soil type	bauxite
Annual Rainfall	2 meters predominantly in Nov- March (wet season).
Incidence of flooding and bushfires	Does not affect water quality in the bores
Land use	Residential and mining.
Agriculture, industry, mining	bauxite mining
Potential sources of microbial and chemical contamination in the catchment	Sewerage infiltration possible following a major rainfall event after dry.

4 Hazard Identification and risk assessment team

Name	Position	Expertise and system knowledge
Siva Ratna	Works Manager	1 year in Napranum as Works manager
Ashley Hudson	Plumber	Completed apprenticeship in 2016 Jan.
Greame Parker	Plumber	Worked in community as plumber for a year now.
Ambrose Williams	ESO	1 year in community operating WTP

4.1 Assessment of Risk

Methodology

The methodology used for the risk assessment has been adopted from the DERM Preparing a Drinking Water Quality Management Plan Supporting Information (Sept 2010).

Maximum risk assumes no preventive measures in place (i.e. no treatment is done); and residual risk is assessed after including the existing preventive measures.

Likelihood	Descriptors
Rare	Occurs less than or equal to once every 5 years
Unlikely	Occurs more often than once every 5 years and up to once per year
Possible	Occurs more often than once per year and up to once a month (12/yrs.)
Likely	Occurs more often than once per month (12/yrs.) and up to once per week (52/yrs.)
Almost Certain	Occurs more often than once per week (52/yr)

Consequence	Descriptors
Insignificant	Isolated exceedence of aesthetic parameter with little or no disruption to normal operation
Minor	Potential local aesthetic, isolated exceedence of chronic health parameter
Moderate	Potential widespread aesthetic impact or repeated breach of chronic health parameter
Major	Potential acute health impact, no declared outbreak expected
Catastrophic	Potential acute health impact, declared outbreak expected

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Medium (6)	High (10)	High (15)	Extreme (20)	Extreme (25)
Likely	Medium (5)	Medium (8)	High (12)	High (16)	Extreme (20)
Possible	Low (3)	Medium (6)	Medium (9)	High (12)	High (15)
Unlikely	Low (2)	Low (4)	Medium (6)	Medium (8)	High (10)
Rare	Low (1)	Low (2)	Low (3)	Medium (5)	Medium (6)

Level of Uncertainty	Definition
Certain	There is 5 years of continuous monitoring data, which has been trended and assessed, with at least daily monitoring; or The processes involved are thoroughly understood.
Confident	There is 5 years of continuous monitoring data, which has been collated and assessed, with at least weekly monitoring or for the duration of seasonal events; or There is a good understanding of the processes involved.
Reliable	There is at least a year of continuous monitoring data available, which has been assessed; or There is reasonable understanding of the processes involved.
Estimate	There is limited monitoring data available; or There is limited understanding of the processes involved.
Uncertain	There is limited or no monitoring data available; or The processes are not well understood.

Uncertainty is based on the "or" statements as there is no long term data available.

Acceptable Risk

Medium residual risks are considered as acceptable risks, and have sufficient control measures to manage the risks. Nonetheless, there are still opportunities for continuous improvement.

High and Extreme risks have been associated with improvement actions.

5 Hazard identification, risk assessment and uncertainty matrices

Hazard	Hazardous event	Max risk			Existing preventive measures / barriers	Residual risk			Uncertainty	Risk management improvement plan
		Consequence	Likelihood	Risk level		Consequence	Likelihood	Risk level		
pH correction										
pH	Run out of lime	Minor	Unlikely	Low	3 palates of lime at a time – lasts 3 months	Minor	Rare	Low	**Reliable**	

	Equipment failure	Minor	Possible	Medium	Multiple pumps, floats etc, maintenance 3 monthly	Minor	Rare	Low	**Reliable**	

Catchment and source infrastructure - Bores

Hazard	Hazardous event	Max risk			Existing preventive measures / barriers	Residual risk			Uncertainty	Risk management improvement plan
		Consequence	**Likelihood**	**Risk level**		**Consequence**	**Likelihood**	**Risk level**		
Bacteria / Virus (harmful)	Sewer leaking into aquifer	Catastrophic	Possible	High	Breaks are fixed as soon as identified, disinfection	Catastrophic	rare	Medium	**Confident**	
Protozoa (crypto and Giardia)	Sewer leaking into aquifer	Catastrophic	Possible	High	Fix breaks as soon as identified	Catastrophic	Possible	High	**Reliable**	Develop program to replace aged sewer mains
No water	Electrical failure	Catastrophic	Likely	Extreme	Portable generators used to run entire system. Any failures likely to be short term.	Major	Rare	Medium	**Reliable**	
	Pump failure	Major	Possible	Medium	Bores 1 and 2 can provide enough water alone – good backup. Incident without water was due to staffing and maintenance issues, not actually bore related.	Major	Rare	Medium	**Confident**	
	Intake line failure	Major	Possible	High	Reactive maintenance	Major	Possible	High	**Reliable**	Develop plan to allow isolation of individual bore lines

Treatment Process

Disinfection										
Chlorine	Overdose	Moderate	Possible	Medium	Mon-Fri testing at WTP. Target 0.5mg/L at end of reticulation.	Moderate	Rare	Low	**Confident**	

Operation and maintenance procedures

There are very few written operational procedures currently used in Napranum. An improvement item has been identified to produce written procedures.
Chlorination and pH adjustment are included in this plan

Procedure	Version date	Comments
pH correction plant operating instruction	July 2012	Awaiting plant handover
Water testing guide	No version control	
Palin test operating instructions	original	
pH adjustment	Current DWQMP	
Chlorination	Current DWQMP	

- Procedures to be developed for mains break repair, flushing, implementing and lifting Boil Water Alerts.
- It is expected that other treatment plant documents will be given to council on handover of infrastructure.

Process for implementing the procedures

The operations manager ensures that staff have appropriate understanding of procedures, and uses verbal checks to ensure understanding.

6 Managing Risks

Risk Management Improvement Program

The risk management improvement actions from the hazard identification and risk assessment matrices have been reproduced below to formulate a risk management improvement program.

The priority level has been classified as low, medium or high. High priority has been assigned to a hazard that can have immediate impact on public health (so basically harmful bacteria). High priority items will be addressed as soon as possible.

Low priority has been assigned to infrastructure improvements that would not impact public health in relatively short term, and budget for which will have to be negotiated. Medium priority has been given to operational improvements that will optimise the system performance.

Catchment and source infrastructure

Hazardous event	Risk management improvement action	Priority	Timeframe	Responsibility
Sewer Leaking into Aquifer	Develop plan to identify priority areas for sewer main replacement	Medium	June 2014	Operations Manager
Intake pipe failure	Develop plan to allow isolation of individual bore lines	High	December 2013 Aim to complete by June 2014. Completed Dec. 2014	Operations Manager

Treatment and Disinfection processes

Hazardous event	Risk management improvement action	Priority	Timeframe	Responsibility
Under dosing	Investigate SCADA for disinfection or increased frequency of monitoring.	High	Dec 2013	Operations Manager
pH correction	Investigate operating Bores 1 and 2 simultaneously all times so that source water pH is constant.	High	Dec 2013. Completed July 2015	Operations Manager

Reticulation

Hazardous event	Risk management improvement action	Priority	Timeframe	Responsibility
Backflow	Reticulation is not thought to meet current plumbing code – upgrade recommended, but will require significant funding – develop proposal for council.	Medium	June 2014	Operations Manager

Whole of Service

Hazard and Hazardous event	Risk management improvement action	Priority	Timeframe	Responsibility
Untrained staff (formally)	Investigate opportunities for formal training for existing staff.	High	Dec 2013 (but ongoing)	Operations Manager
Information management – data storage	Develop electronic record keeping	High	Dec 2013. Completed July 2015.	Operations Manager
Lack of written operating procedures	Development of written operating procedures as identified in the operation and maintenance procedures section.	Medium	June 2014. Completed Sept. 2015.	Operations Manager

	Dead end storages, long detention	Major	Possible	High	2 dead ends, lower end is a testing location. Disinfection Monthly flushing	Major	Rare	Medium	Confident	
No water	Pipe breaks / mains breaks (age, pressure)	Moderate	Possible	Medium	Reactive	Minor	Unlikely	Low	Reliable	

Whole of Service

Hazard & Hazardous event	**Max risk**			**Existing preventive measures / barriers**	**Res risk**			**Uncertainty**	**Risk management improvement plan**
	Consequence	**Likelihood**	**Risk level**		**Consequence**	**Likelihood**	**Risk level**		
Staff Turnover/ Insufficient Training leading to unsafe water	Catastrophic	Possible	High	DWQMP, but no training	Catastrophic	Unlikely	High	Confident	More training and support required – investigate certificate level training
Water quality data storage and summary	Minor	Possible	Medium	Data is recorded in paper and filed Electronic copy received from laboratory and filed	Minor	Possible	Medium	Confident	Investigate possibilities electronic data storage
Vandalism – introduction of harmful bacteria or toxic chemicals	Major	Rare	Medium	fenced and secured bores Visual checks by	Major	Rare	Medium	Confident	
				operators regularly					

Bacteria/Virus	Underdose	Catastrophic	Possible	High	Mon-Fri testing, target 0.5 mg/L at end of retic	Catastrophic	Unlikely	High	**Reliable**	Investigate SCADA for disinfection or increased frequency of monitoring.
pH	Incorrect mixing	Minor	Almost certain	High	pH adjusted manually for mixing under certain bore operation systems	Minor	Almost certain	High	**Confident**	Investigate operating Bores 1 and 2 simultaneously all times so that source water pH is constant.

Reservoir – storage tanks

Hazard	Hazardous event	Max risk			Existing preventive measures / barriers	Residual risk			Uncertainty	Risk management improvement plan
		Consequence	Likelihood	Risk level		Consequence	Likelihood	Risk level		
Bacteria or Viruses	Vermin entry	Catastrophic	Unlikely	High	Daily walk by inspection 3 monthly internal inspection	Catastrophic	Rare	Medium	Reliable	
No water	No water in the reservoirs	Catastrophic	Rare	Medium	Maintenance schedule	Major	Rare	Medium	Confident	

Reticulation

Hazard	Hazardous event	Max risk			Existing preventive measures / barriers	Residual risk			Uncertainty	Risk management improvement plan
		Consequence	Likelihood	Risk level		Consequence	Likelihood	Risk level		
Bacteria (harmful)	Pipe breaks / mains breaks (age, pressure)	Catastrophic	Possible	High	Repair as soon as identified. Informal procedure followed	Major	Rare	Medium	Reliable	
	Low or negative pressure / backflows	Catastrophic	Possible	High	System is always pressurised	Catastrophic	Unlikely	High	Reliable	Reticulation is not thought to meet current plumbing code – upgrade recommended, but will require significant funding

Napranum Aboriginal Shire Council

Process Control	DISINFECTION	Water Yard
Element		Chlorination
Process Control		Set point manual adjustment – operation automatic with bore pump
Purpose		Disinfection
Major Potential Hazards		Bacteria and Virus
Hazardous Events		Sewerage infiltration, ingress into storage, ingress in reticulation
Existing Preventive Measures		▯ Daily monitoring (sampling) – disinfection is dosed
Monitoring Limits	*Limits*	**Critical Limit <0.5 or >5** **Action Limit 0.5 to 1 (increase dose) 3 to 5 (decrease dose)** **Target Limit 1 to 3**
	Frequency	 **Week Days**
	Primary Responsibility	**ESO**
Operational Monitoring	*Parameter*	**Free Chlorine in Reticulation**
	Limits	➢ **0.5 mg/L** ➢ **<0.5 mg/L flush reticulation (dead ends) and/ or increase dose at water yard** ➢ **Critical Limit <0.5 or >5** Seven days a week
	Frequency	
	Primary Responsibility lity	ESO
Corrective Actions	*Action*	▯ Re-sample to confirm. If outside target ▯ adjust chlorine dose at water yard to bring back into target ▯ Flush reticulation to pull through disinfected water ▯ If disinfection cannot be re-established, contact Operations Manager ▯ Consider implementing Boil Water Alert
	Reporting	▯ Report to QWSR if >5 mg/L or Boil Water Alert implemented.
	Primary Responsibility lity	ESO and Works Manager
Records		Analysis report held by Essential services officer
Notifications		**ESO** **ESO and Manager** ESO and Works Manager, if Boil Water Alert contact CEO

Napranum Aboriginal Shire Council

Process Control		pH control	Water Yard
Element		pH control	
Process Control		Set point manual adjustment daily	
Purpose		Appropriate pH for effective disinfection	
Major Potential Hazards		Bacteria and Virus	
Hazardous Events		Bacterial and viral contamination	
Procedure		□ pH adjustment plant procedure	
Monitoring Limits	*Limits*	**>8.5** **Action Limit < 6.8 or 7.5 to 8.5** **Target Limit 6.8 to 7.5**	
	Frequency	 **Week Days**	
	Primary Responsibility	**ESO**	
Operational Monitoring	*Parameter*	pH after adjustment at water yard	
	Limits	➢ **6.8 to 7.5** ➢ **<6.8 or > 7.5** ➢ **>8.5**	
	Frequency	Seven days a week	
	Primary Responsibility	ESO	
Corrective Actions	*Action*	□ Re-sample to confirm. If outside target □ adjust mixing ratio to bring back into target □ Check pH in reticulation if also > 8.5 adjust pH and consider flushing to ensure effective disinfection	
	Reporting	. □ Report to QWSR if process has completely failed.	
	Primary Responsibility	ESO and Works Manager	
Records		Analysis report held by Works Manager	
Notifications		**ESO** **ESO and Manager** ESO and Works Manager,	

7 Management of incidents and emergencies

The process for managing drinking water incidents and emergencies are described in the tables below. The first table provides the overview (alert level, description, key response and positions responsible). The second table gives the summary of actions and procedures.

All level 2 3 alerts are notified to the Operations Manager, who remains on call by mobile phone 0428394854 The water staff have received on the job training on incident and emergency response protocols in order to operate as required, with overall supervision and management provided by the Operations Manager.

Management of Incident and Emergency Levels – Overview

Alert Level	Description	Key management response(s)	Position(s) responsible
Level 3: Emergency	• outbreak of waterborne disease • major event (something that has happened or is likely to happen, in relation to a drinking water service that may have an adverse effect on public health, and is unable to be controlled using normal procedures (e.g. terrorism, deliberate contamination of treated water, source water where treatment is ineffective) • declared disaster or emergency situation by the Council or state/national government *Requires coordination across the Council departments and is likely to require external resourcing and support from Stakeholders and or agencies, such as Queensland Water Supply Regulator, Queensland Health, local disaster management groups, emergency responders QFRS, Police*	Activate disaster management plan if appropriate Activate incident response and reporting protocols. Request advice from Aquamanage or other experts as appropriate to regain control. *Refer to summary of actions and procedures*	CEO (if appropriate – e.g. DMP). Operations Manager
Level 2: Incident	• non-compliance (typically against the ADWG values) • minor event. Examples include natural disaster (flood, drought), bushfire, inability to operate system within acceptable operational limits but where rectification is likely prior to unsafe water delivered. *Incident is managed within the team responsible for drinking water operations and management in line with the Wujal Wujal DWQM Plan. In some cases, it may require coordination across the Council departments and external resources and support, such as from OWSR, Queensland Health.*	Activate drinking water incident response and reporting protocols. Ensure all control measures identified in the DWQM Plan are functioning effectively. *Refer to summary of actions and procedures*	Operations Manager Essential Services Officer
Level 1: Operational exceedence	□ Exceedences of operational limits (as per the operational monitoring section of the Plan). *Incident is managed within the water operations team. An incident is not declared and the issue can be managed in line with the DWQM Plan.*	Ensure all operational steps identified in the DWQM Plan are functioning effectively. Check and act upon operations records. Incident response and reporting protocols on standby. *Refer to summary of actions and procedures*	Operator under guidance from Essential Services Officer

Management of Incident and Emergency Levels – Summary of Actions and Procedures

Alert Level	Key management response(s)	Brief summary of actions	Documented Plans & Procedures
Level 3: Emergency	Activate incident response and reporting protocols. Request advice from Aqua manage or other experts as appropriate to regain control. Activate disaster management plan if appropriate	• CEO to notify Council and assemble team • Coordinate notification, investigation and response of water related aspects • Consider what community notification / messaging is needed (e.g. do not drink alert, boil water alert or bottled/emergency water distribution) • Coordinate community messaging, for e.g. boil water alert, do not drink alert as required • Notify OWSR as soon as practicable	Disaster management plan, including communications protocols.
Level 2: Incidents	Activate drinking water incident response and reporting protocols. Ensure all control measures identified in the DWQM Plan are functioning effectively.	• Essential Services Officer to inform the Operations Manager. • Report incident to QWSR within the required timeframe • Ensure all control measures identified in the DWQM Plan are functioning effectively. • Commence investigation to determine cause if not traceable through the DWQM Plan • Arrange for re-samples to be taken where required • Instigate immediate remediation actions, including isolation of affected area where possible • Review associated laboratory reports and operational records. • In case of customer complaints, coordinate investigation and resolution, including obtaining water samples where required	Incident response and reporting protocols (i.e. OWSR Water Quality and Reporting Guideline). Napranum DWQM Plan.
Level 1: Operational exceedence	Ensure all operational steps identified in the DWQM Plan are functioning effectively. Check and act upon operations and maintenance records. Incident response and reporting protocols on standby.	• Operations staff to notify Essential Services Officer. • Review operations and maintenance records for anomalies • Commence investigation to determine cause, if not identifiable through operational records • Instigate immediate remediation actions • Ensure all control measures identified in the DWQM Plan are functioning effectively. • Increase operational monitoring frequency where required • Ensure incident response and reporting protocols are on standby if the need arises.	Operations and maintenance procedure Napranum DWQMP.

8 Service Wide Support – Information Management

Water Quality Information

The water quality data from the Cairns laboratory are received electronically in their laboratory reporting format and stored electronically in the ESO's computer and also as hard copies. The operational monitoring data are recorded on log sheets and filed in the Essential Services Supervisor's office.

Process for incident reporting

The incident response and reporting protocols (mentioned earlier under the management of incident and emergencies section) have been adopted from the QWSR Drinking Water Service Provider Monitoring and Reporting Requirement guidelines.

This is summarised as below:

Incident	Reporting requirements (to OWSR)
Detection of *E. coli*, detection of a pathogen, failure to meet ADWG health guideline values	By telephone within 3 hours of receipt of test results
Radiological (exceed levels described in the notice)	By telephone within 3 hours of receipt of test results
Parameters with no ADWG guideline value	Written confirmation within 24 hours
An event likely to affect water quality	By telephone as soon as practicable

The reporting number is 1300 569 709

Part A and B forms will be submitted as required.

9 Operational and Verification Monitoring

Operational Monitoring

The operational monitoring for Napranum includes free chlorine at 5 locations:
Water Yard (point of dosing),
School (vulnerable customers)
Hospital (vulnerable customers)
Twal st. (dead end)
Tavern (dead end)

PH is monitored at the water yard daily and mixing ratios are set for chlorine daily. Currently, the source bore(s) changes unpredictably, so until changes are made to source selection, control of pH adjustment is limited.

Responses to excursions are presented in the process control documents on the following pages. They are colour coded to link to the emergency response plan.

Visual Checks, Observations and Inspections:

Visual inspections and checks (observations) are also conducted as part of the operational monitoring to ensure that preventive measures function as required and that total reliance is not only on water quality testing.

The visual checks and inspections done include:

- Fence integrity around bores – daily by operators.
- All chlorinators working properly - daily by operators.
- Reservoir levels – daily by operators
- Aquifer level – daily

Note Daily means seven days – these checks are currently conducted on the weekends.

Operational monitoring	Frequency
Bores	Daily

Check bore operations	Daily
General site maintenance and fence integrity check	Weekly
Inspection and testing of switchboards (by electrician)	Bi-monthly
Treatment Plant and reservoirs	Daily
Check chlorinator and chlorine stock	monthly
General site maintenance, ensure site is secure and fences maintained.	Daily
Inspection of reservoirs for leaks, overflow or vandalism	Daily
Clean out reservoirs, service float sensors, repair any corrosion	When needed
Inspection and testing of switchboards (by electrician)	Bi-monthly
Reticulation	Daily
Check for leaks	Daily

10 Verification Monitoring (Reportable to OWSR)

The verification monitoring for Napranum is used to confirm that safe water is delivered to customers in compliance with the ADWG and Public Health Act.

Verification monitoring is currently limited to *E. coli* monitoring (samples collected by the ESO at the operational locations once a week and tested in house using Colisure. Samples are also collected at the operational monitoring locations and sent to the lab in Cairns on a monthly basis. This is considered appropriate as the tight limits on chlorination should ensure that safe water is produced and the verification monitoring is only to confirm this. If *E. coli* is in reticulation, this is considered a level 2 incident and actions taken as per the emergency response plan.

Consideration is being given to commencing Colilert. At this time consideration will also be given to undertaking 6 monthly monitoring of the bore water (standard water analysis and metals scan) to better characterise any changes in the catchment, and ensure that the risk assessment is accurate.

Appendix: Boil Water Alert template

Boil water Alert Napranum Aboriginal Shire Council

xx/xx/201x

All residents and guests in Napranum should boil drinking water until further notice.

This advice has been issued following the detection of E. coli, which indicates that drinking water may be contaminated.

Customers should bring water to the boil and then allow it to cool before using it. Boiled water can be stored in a clean, closed container for later use. Customers should boil ALL water used for:

- drinking,
- brushing teeth,
- washing and preparing food or drinks,
- preparing baby formula,
- making ice
- Unboiled water can be used for:
- flushing toilets
- showers and baths – (but babies and toddlers should be sponge bathed.)
- washing dishes (if allowed to dry completely before using again) ➢ washing clothes

Drinking unboiled water could lead to illness. Contact the Hospital if you become sick at this time.

Council is working hard to identify and fix the problem as soon as possible, and is sorry for the inconvenience.

Please share this advice with neighbours and friends.

Boil water alert no longer needed as of xx/xx/201x

Napranum Aboriginal Shire Council advises that the town water is again safe to drink, and it is no longer necessary to boil water before use.

As a final check, please run your internal taps for 2-3 minutes to ensure that any contaminated water is removed from the plumbing.

Please share this advice with neighbours and friends.