Drinking Water Quality Management Plan Report

Aurukun Shire Council

SPID: 5

2019 - 2020

This report has been prepared in accordance with the Drinking Water Quality Management Plan Report Guidance Note.

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1 Introduction

This is the Drinking Water Quality Management Plan (DWQMP) report for Aurukun Shire Council (ASC) for the financial year 2019 – 2020

ASC is a registered service provider with identification (SPID) number 5. ASC is operating under an approved DWQMP to ensure consistent supply of safe quality drinking water in order to protect public health. This is done through proactive identification and minimisation of public health related risks associated with drinking water.

This DWQMP report includes:

- The activities undertaken over the financial year in operating our drinking water service.
- Drinking water quality summary.
- Summary of our performance in implementing our DWQMP.

This report is submitted to the Regulator to fulfil our regulatory requirement and is also made available to our customers through our website or for inspection upon request at council office.

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2 Summary of scheme/s operated

The Aurukun Water Supply Scheme is responsible for supplying clean & safe drinking water to the 1,200 – 1,400 residents of the Aurukun community.

Table 1 – Summary of schemes

Scheme	*Water Source*	*Treatment processes*	*Treatment capacity*	*Towns supplied*
ASC Town Water Supply	1. Airport Bore (RN148892) 2. Alex Dore (RN45118) 3. Tavern Bore (Unavailable) 4. Carpenters Bore (RN45557) 5. Tower Bore (RN45554)	Soda Ash & Gaseous Chlorine.	1.7 ML per Day	Aurukun

3 DWQMP implementation

The Technical Services Department of the Aurukun Shire Council (ASC) has the responsibility of operating the Aurukun Community water supply & wastewater system and its associated infrastructure. Mick McLeod the Works Manager (WM) is the person responsible for the daily operation of the water supply and wastewater system. The Works Manager reports to the Director of Technical Services (DTS) Gus Yates who is responsible for overall management of the system.

The Technical Services Department meets fortnightly to discuss operational issues and procedures. The Aurukun Water Supply and Wastewater system and its operational plan is an agenda item. The Works Manager holds meetings three times each week to ensure his staff are on track and following the plan. All staff are aware of the current Risk Assessment chart and are required to report any changes immediately.

The Director of Technical Services and the Works Manager meet to discuss outstanding DWQMP compliance issues and plan remedial action to address same. Important issues raised at these meetings will be referred to the weekly ASC Executive Management meeting where it will be discussed by the Director of Community Services, Director of Corporate Services, Finance Manager and the CEO.

During the reportable period Aurukun Shire Council focused on the following items in the risk management improvement program.

1) Quarterly bore samples.
2) Increased the suite of testing to include additional metals
3) Increased raw water monitoring at bores to quarterly from six monthly
4) Reconfiguring and cleaning up the landfill
5) Designing a bore monitoring field around the landfill site and developing a testing regime
6) Scoping and developing capital projects to improve the water infrastructure and SCADA systems.
7) Councils ICT team have developed three policies relating to ICT security, these policies been adopted by Council and implemented during the 2019 – 2020 reporting period.

Table 2 – Risk management improvement program implementation status

Scheme name	Ref	Component	Improvement actions	Target date	Actions taken to date	Current Status	Review Date	Responsible Officer / Position
ASC Supply	WS 1 to 4	Source	Investigate bores on NRM registered bore list to ensure old bores are capped	30/11/18	Information to date from DNR indicates all old bores are secured. Inspected bore sites and confirmed they are secure.	Completed	16/09/19	A Yates / DTS
ASC Supply	WS 5	Source	One (1) house on untreated supply – Install treated supply to house	30/11/18	Service line has been disconnected from the main and the residence.	Completed	23/11/20	A Yates / DTS
ASC Supply	WS 7	Source	Commence quarterly ammonia/nitrate testing	30/11/18	Quarterly Testing commenced July 2019	Ongoing testing	23/11/20	A Yates / DTS
ASC Supply	WS 6 & 8	Source	Ensure no Ingress into bore head	30/11/18	No event to date - Continuous monitoring	Existing known bores capped Ongoing monitoring	Ongoing	M McLeod / WM
ASC Supply	WA 1	Treatment	Ensure no Contamination of chemicals used	30/11/18	Monitoring & Checks	Ongoing monitoring	Ongoing	M McLeod / WM
ASC Supply	WA 2	Treatment	Develop Soda Ash dosing protocols.	30/11/18	Dosing procedure had been documented but needs revision to improve readability.	Complete Compiling SOP's into an operation's manual ongoing.	23/11/2020	A Yates / DTS M McLeod / WM
ASC Supply	WA 2	Treatment	Upgrade SCADA to control & monitor dosing procedure.	1/5/19	Sourced funding for SCADA upgrade – ICCIP Program	Proposed ICCIP Project – SCADA Upgrade (Currently in design phase)	23/11/2020	A Yates / DTS M McLeod / WM
ASC Supply	WA 3	Treatment	Corroded Fittings	26/06/20	Inspection of components.	Inspection Completed	23/11/2020	A Yates / DTS M McLeod / WM
ASC Supply	WA 4	Treatment	Incorrect dosing		Continuous monitoring (SCADA monitoring)	Proposed ICCIP Project – SCADA Upgrade (Currently in design phase)	Ongoing	M McLeod / WM
ASC Supply	WC 1	Treatment	Develop gas chlorine SOP, investigate as-con drawings for water supply scheme	30/11/18	Gas Chlorine SOP in place however document lacks structure.	Completed Compiling SOP's into an operation's manual ongoing.	23/11/2020	A Yates / DTS M McLeod / WM
ASC Supply	WC 1	Treatment	Upgrade SCADA to control & monitor Gas Chlorine dosing.	1/5/19	Sourced funding for SCADA upgrade – ICCIP Program	Proposed ICCIP Project – SCADA Upgrade (Currently in design phase)	23/11/20	A Yates / DTS M McLeod / WM
ASC Supply	WC 2	Treatment	Overdosing Soda Ash		Continuous monitoring (SCADA monitoring ?)	Proposed ICCIP Project – SCADA Upgrade (Currently in design phase)	23/11/20	A Yates / DTS M McLeod / WM
ASC Supply	WA 3	Treatment	Incorporate auto shut-off valves for chlorine cylinders	10/12/18	None	Proposed ICCIP Project - Water Treatment Plant Upgrade (Currently in design phase)	23/11/20	A Yates / DTS M McLeod / WM
ASC Supply	WA 4	Treatment	Overdose Chlorine		Continuous monitoring (SCADA monitoring?)	Proposed ICCIP Project – SCADA Upgrade (Currently in design phase)	23/11/20	A Yates / DTS M McLeod / WM
ASC Supply	WA 5	Treatment	Flushing SOP, Reservoir inspection program procedure	10/12/18	Some SOP documents found.	Drafted ready for review.	20/01/19	A Yates / DTS M McLeod / WM

Scheme name	Ref	Component	Improvement actions	Target date	Actions taken to date	Current Status	Review Date	Responsible Officer / Position
ASC Supply	RD 1 & 5	Distribution	Cross connection between old water reticulation system and new main supply system. Old system must remain live & fully chlorinated until cross connection found.	13/12/18	Advice sought from Qld Health, DLGRMA, and DNRME. Design documents obtained to assist in locating potential cross connections. An Investigation was carried out and a cross connection was discovered & removed.	Inspected various sections of old Main no pressure in the main Completed	22/08/19	A Yates / DTS M McLeod / WM
ASC Supply	RD 2 to 4	Distribution	Develop SOP's for Commissioning new mains & repairing breaks to existing systems	10/12/18	Some SOP documents found.	Developing & documenting procedures Compiling SOP's into an operation's manual ongoing.	23/11/20	A Yates / DTS M McLeod / WM
ASC Supply	RD 6	Distribution	Stagnation		Continuous monitoring	Fortnightly flushing program established and implemented Include in an operation's manual ongoing.	Ongoing	M McLeod / WM
ASC Supply	SY 1	System	Develop testing protocols for backup power generators to ensure they are operational should mains power fail.	30/11/18	ASC Electrician & Plant Maintenance requested to devise maintenance & test schedule.	Completed / ongoing Testing & maintenance plan created & implemented	23/11/2020	A Yates / DTS M McLeod / WM R Kooiman / ES G Ackland / WSM
ASC Supply	SY 2	System	Conduct condition inspection on old reservoir, pipework & produce schematic	30/11/18	Inspection carried out – hand sketch produced Proposed ICCIP project – Water treatment plant upgrade Existing pipework exposed; details taken.	Data collected schematic being Prepared by Consulting Engineers Internal inspection still required	20/01/20	A Yates / DTS M McLeod / WM
ASC Supply	SY 3	System	Continue Monitoring Supply System Security		Continuous monitoring	Ongoing	Ongoing	M McLeod / WM ASC Security
ASC Supply	SY 4	System	Training additional water system operators including operators	30/11/18	Advised ASC HR dept HR have been working with State departments to arrange training and funding	Additional staff training Ongoing When employing new staff looking for candidates with prior experience.	23/11/2020	A Yates / DTS M McLeod / WM
ASC Supply	SY 5	System	Develop SOP's for pH, Chlorination, mains break repair, reservoir inspection, recording operational data, Sampling & testing	30/11/18	SOP's have been found and reviewed for most of the tasks in question, however, they lack cohesion as an overall system operation manual.	Revising & compiling SOP's into an operation's manual	30/08/20	A Yates / DTS M McLeod / WM
ASC Supply	SY 6	System	Review Water Supply Disaster Management Procedures	14/12/18	Disaster Management initiated 14/12/18 with the approach of TC Owen. System operational & ready	System functional & normal.	20/1/19	A Yates / DTS M McLeod / WM
ASC Supply	SY 7	System	Investigate upgrades to SCADA system to improve Water Supply	30/11/18	Funding has been sourced from ICCIP Design phase commenced	Proposed ICCIP Project – SCADA Upgrade	23/11/2020	A Yates / DTS

Scheme name	Ref	Component	Improvement actions	Target date	Actions taken to date	Current Status	Review Date	Responsible Officer / Position
ASC Supply	SY 8	System	Contractor Management Procedures	30/11/18	A significant change has been implemented in how ASC engages with contractors. Contractors are required to register their presence with ASC and undergo an induction process before commencing work.	Contractor engagement procedures are in place	20/1/19	A Yates / DTS M McLeod / WM

4 Verification monitoring - water quality information and summary

This table shows the DWQMP required testing schedule for 12 months.

Table 3 – Drinking water quality performance - verification monitoring

Scheme name	Parameter	No. of samples required to be collected (as per the approved DWQMP)	No. of samples collected and tested	Water quality criteria (i.e. ADWG health guideline value)	No. of non-compliant samples	Comments
ASC Water Supply	Standard Analysis	4	4	Refer health Guidelines	0	All 5 Bores
ASC Water Supply	Metals	4	4	Refer health Guidelines	0	All 5 Bores
ASC Water Supply	Standard Analysis	12	To commence in 2021	Refer health Guidelines	0	Mix of all 5 Bores
ASC Supply	E. coli	4	4	<1.0 CFU/100ml	0	All 5 Bores
ASC Supply	E. coli	4	4	<1.0 CFU/100ml	0	Quarterly Test
ASC Supply	E. coli	52	36	<1.0 CFU/100ml	0	Treatment Plant
ASC Supply	E. coli	52	36	<1.0 CFU/100ml	0	Reticulation
ASC Supply	Free Chlorine	4	4	< 5 mg/L	0	Quarterly Test
ASC Supply	Free Chlorine	52	36	< 5 mg/L	0	Treatment Plant
ASC Supply	Free Chlorine	52	36	< 5 mg/L	0	Reticulation
ASC Supply	pH	4	4	6.5 – 8.5	0	Quarterly Test
ASC Supply	pH	52	36	6.5 – 8.5	0	Treatment Plant
ASC Supply	pH	52	36	6.5 – 8.5	0	Reticulation
ASC Supply	Turbidity	4	4	≤ 5 NTU	0	Quarterly Test
ASC Supply	Turbidity	52	36	≤ 5 NTU	0	Treatment Plant
ASC Supply	Turbidity	52	36	≤ 5 NTU	0	Reticulation

Table 4. E. coli compliance with annual value

Drinking water scheme: Aurukun Community Water Supply

Year	**2019 – 2020**											
Month	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	10	8	6	4	4	2	0	2	8	10	10	8
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	6	6	8	10	8	4	8	8	8	6	4	8
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100	100	100	100	100	100	100	100	100	100	100	100
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

5 Incidents reported to the regulator

No incidents were reported to the regulator.

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Table 5 – Incidents reported to the regulator

Incident date	Scheme / location	Parameter / issue	Preventive actions
N/A	ASC Water Supply	No Incidents reported	N/A

6 Customer complaints

Throughout the reporting period no customer complaints were received.

Table 6 – Example: customer complaints about water quality

Scheme	Health concern	Dirty water	Taste and odour	Other
ASC Water Supply	0	0	0	0
Total	**0**	**0**	**0**	**0**

No complaints were received about ASC Water Supply.

7 DWQMP review outcomes

No review was conducted during the reporting period 01/07/2019 to 30/06/2020.

The Drinking Water Quality Management Plan for Aurukun Shire Council was drafted & submitted in September 2018 as a result of the DWQMP review in the 2017 – 2018 year was approved for use with conditions by the Department.

Table 7 – DWQMP review outcomes

Review Date: 16/09/19

Review component	Findings	Outcomes	Status of actions	Responsible Officer / Position
Service description	No changes	Not applicable	Not applicable	
Details of infrastructure				
Water quality and catchment characteristics	No changes in catchment details. Water quality data is available	Testing of water quality to establish a current benchmark.	Benchmark testing commenced January 2019	DTS & WM
Risk assessment	A new risk assessment is required as the current one does not accurately portray the remaining risk after mitigation	To be reviewed as part of the DWQMP resubmission	Completed	DTS, WM, ES & WHSO.
Operations and maintenance procedures	SOP's of operational tasks needs revising and compiling into an Operational Manual for the ASC Water Supply System	SOP's collected & reviewed	Assembly of overarching document will be further developed in the 2020 – 2021 reporting period.	DTS & WM
Management of incidents and emergencies	Incidents & emergencies are responded to very quickly and resolved within hours, however there is no framework to record & track same other than diary notes.	A system of tracking emergency responses along with the resolution outcomes needs to be implemented.	Discussions to develop system scheduled for 2021	DTS & WM

Review component	Findings	Outcomes	Status of actions	Responsible Officer / Position
Risk management improvement program	Risk management assessments should be carried out at least every 3 months over the whole ASC water system.	A risk assessment will be carried every 3 months.	2021	DTS, WM, ES & WHSO
Service wide information management	Council does not have ICT policies in affect during the 18 – 19 reporting [p	Council to develop relevant ICT policies.	ICT Team has developed, adopted and implemented policies in the 2019 – 2020 reporting period.	ICT team & DTS
Operational monitoring	Daily testing of Chlorine Levels required on old water main until total separation from new water main is confirmed.	The operational monitoring program is working	No action required	DTS & WM
Verification monitoring	Raw water testing of bores was not occurring	Testing to commence ASAP	Raw water monitoring has commenced	DTS & WM

8 DWQMP audit findings

There was no audit conducted or required during the required period 01/07/2019 and 30/06/2020.

Table 8 – DWQMP audit findings and status

Item	Recommendation or OFI	Action	Status of actions	Responsible Officer / Position

Table 9 Mitigated Risks as per DWQMP

Process Step	Ref	Primary hazard	Other hazards managed by same barriers	Source of Hazard/Event	Maximum Risk	Primary Preventive Measure	Other Preventative Measures	Residual Risk				Documented Procedure	RMP			Comments
					Risk Level			Consequence	Likelihood	Risk Level	Uncertainty		Immediate	Short Term	Long Term	
Water Source	WS 1	Loss of Supply		Bore pump failure	High 12	Five production bores	Two spare pumps	Catastrophic	Rare	Medium 6	Certain				Investigate future increases in population impact on drinking water demand and supply requirements	Back up generators are tested, services and refueled at regular intervals.
	WS 2	Bacteria/ Virus (Source Water)		Ingress into bore head	High 10	Bore heads sealed	Chlorination	Catastrophic	Rare	Medium 6	Certain					Cemetery has been re-located away from shallow groundwater
	WS 3	Bacteria/ Virus (Source Water)		Ingress into aquifer through abandoned bores	High 10	Active Bore heads sealed	Chlorination	Catastrophic	Rare	Medium 6	Certain		decommission old bores - including at Bores 2 and 3.	Investigate bores on NRM registered bore list to ensure old bores are capped		All old disused bores have been identified, capped and sealed
	WS 4	Protozoa (Crypto/ Giardia) (Source Water)		Ingress into aquifer through abandoned bores	High 10	Active Bore heads sealed		Catastrophic	Possible	High 15	Certain			Investigate bores on NRM registered bore list to ensure old bores are capped		All old disused bores have been identified, capped and sealed
	WS 5	Pathogens (Single house airport bore)		Ingress into airport bore impacting single house currently serviced with raw water only.	Medium 8			Major	Unlikely	Medium 8	Certain		Install new treated water line to house			Resolved / completed Water service has been disconnected from this property. Resident has relocated to alternative accommodation
	WS 6	Protozoa (Crypto/ Giardia) (Source Water)	Turbidity Hydrocarbons, pesticides	Ingress into bore head	High 10	Bore heads sealed	Water sourced from groundwater; sandy aquifer likely to remove surface derived protozoa	Catastrophic	Rare	Medium 6	Confident					No E coli detected in raw water, so limited likelihood of this pathway Unused bore heads have been identified and sealed
	WS 7	Protozoa (Crypto/ Giardia) (Source Water)		Sewage leaks into aquifer	High 10	Fix sewer mains breaks when identified		Catastrophic	Unlikely	High 10	Estimate		Commence quarterly ammonia/nitrate testing			Quarterly Ammonia Nitrate testing has commenced The location of sewerage assets near the water treatment bores means that there is a possibility of a sewerage break contaminating the aquifer. This would only be able to be identified by monitoring.
	WS 8	Aluminum	Iron	Naturally present	Medium 6			Minor	Possible	Medium 6	Confident					No aluminum detections above aesthetic guideline
pH adjustment	WA 1	Heavy metals/metalloids		Contaminated chemicals	Medium 9	Bulk soda ash procured from reputable supplier		Moderate	Rare	Low 3	Confident	Council procurement policy				Low doses would require significant chemical contamination
	WA 2	pH	Copper, Heavy metals	Underdose of soda ash leading to low pH water	High 15	Daily pH check and adjustment	1.5 days storage in reservoirs, spare pump kept on-site. Online instrumentation measures pH, but no alarms, online data or control. 6 monthly external instrument calibration	Moderate	Possible	Medium 9	Confident		Develop soda ash dosing procedure.		Review SCADA system options	**Soda ash dosing procedure is in draft format for inclusion into a future management system** **Improvements to SCADA system to monitor for this is being considered as an ICCIP project** Daily data since July 2017 indicates average pH around 7. Online monitoring included in system, but not connected to SCADA.
	WA 3	Heavy metals/metalloids	Turbidity, Hydrocarbons	Corrosion of metal fittings	Medium 9	Replacing brass fittings		Moderate	Possible	Medium 9	Estimate			Consider also addressing corrosivity of water		Incorrect valve materials used in reticulation upgrade, and there are significant corrosion issues
	WA 4	pH		Overdose of soda ash, resulting in customer complaints	High 15	Daily pH check and adjustment	1.5 days storage in reservoirs, spare pump kept on-site. Online instrumentation measures pH, but no alarms, online data or control. 6 monthly external instrument calibration	Moderate	Rare	Low 3	Confident					**Improvements to SCADA system to monitor for this is being considered as an ICCIP project** Pump capacity not believed capable of achieving overdosing
Chlorination	WC 1	Bacteria/ Virus (Source Water)		Failure to dose/ underdose	High 10	Gaseous chlorine set-point controlled	daily monitoring and response to low dose	Catastrophic	Unlikely	High 10	Reliable		Develop gas chlorine SOP, investigate as-con drawings for water supply scheme		Review SCADA system options	**Gas Chlorine SOP is in draft format for inclusion into a future management system** **Improvements to SCADA system to monitor for this is being considered as an ICCIP project** Set point 0.6 mg/L. Chlorine dosing levels administered by controller, but not connected to SCADA. Unable to calculate c.t. as reservoir configuration is currently unknown. As-con drawings will be sought. Reason likelihood is unlikely is because chlorine is only checked daily, no alerts/SCADA trends, so any incident cannot be controlled
	WC 2	Bacteria/ Virus (Source Water)		Overdose of soda ash, impacting disinfection	High 10	Daily pH check and adjustment		Catastrophic	Rare	Medium 6	Reliable					Overdose to the point that disinfection is ineffective is not considered realistic
	WC 3	Chlorine		Overdose of chlorine	High 12	Daily chlorine check and adjustment	6 monthly external instrument calibration	Moderate	Possible	Medium 9	Reliable		Incorporate auto-shut-off for chlorine cylinders			**Improvements to SCADA system to monitor for this is being considered as an ICCIP project** Chlorine testing has demonstrated consistent chlorine across network. Future verification will focus on treatment plant and one site in community
	WC 4	Disinfection byproducts		Overdose of chlorine reacting with organics	Low 3	Set-point chlorine dosing		Moderate	Rare	Low 3	Reliable					Groundwater source is expected to have very low TOC, very high-water use means low water age, and chlorine target is low.

	WC 5	Bacteria/ Virus (Reticulation)		Human access, vandalism, sabotage, animals, ingress, broken mains, biofilm shearing, sediment disturbance	Extreme 20	Exclusion fencing	Ladders removed, hatches locked, broken infrastructure replaced, f/n flushing, chlorine dosing, reservoir cleaning	Catastrophic	Unlikely	High 10	Reliable		Flushing SOP, Reservoir inspection program procedure			**Flushing SOP is in draft format for inclusion into a future management system** **Reservoir Inspection program is being developed and with be included into the future management system.**

Process Step	REF	Primary hazard	Other hazards managed by same barriers	Source of Hazard/Event	Maximum Risk	Primary Preventive Measure	Other Preventative Measures	Residual Risk				Documented Procedure	RMIP			Comments
					Risk Level			Consequence	Likelihood	Risk Level	Uncertainty		Immediate	Short Term	Long Term	
Reservoirs & Distribution	RD 1	Bacteria/ Virus (Reticulation)		Backflow from old reticulation	Extreme 20	Chlorine maintained in reticulation		Catastrophic	Possible	High 15	Reliable					Physical checks have been undertaken on the old reticulation main. There is no pressure in the old main.
	RD 2	Bacteria/ Virus (Reticulation)		Mains break	Extreme 20	Chlorine maintained in reticulation	New reticulation completed in 2014	Catastrophic	Unlikely	High 10	Estimate		Mains break SOP			**Mains break SOP is in draft format for inclusion into a future management system**
	RD 3	Bacteria/ Virus (Reticulation)		New mains	Extreme 20	Chlorine maintained in reticulation		Catastrophic	Unlikely	High 10	Estimate		Commissioning new mains SOP			**New mains SOP is in draft format for inclusion into a future management system**
	RD 4	Protozoa (Crypto/ Giardia) (Retic)	Turbidity (Retic)	Vermin ingress, human access to reservoirs	Extreme 20	Isolate access to reservoirs	Periodic inspections	Catastrophic	Rare	Medium 6	Reliable					
	RD 5	Protozoa (Crypto/ Giardia) (Retic)	Turbidity (Retic)	Backflow from old reticulation	Extreme 20		Cross-connections removed if identified	Catastrophic	Likely	Extreme 20	Reliable		Request advice from Qld Health, DLGRMA, and DNRME. Since highlighting this issue, DLGRMA has facilitated engagement with original designer Aurecon who are attempting to locate design documents to allow identification of potential cross connection locations. If identified, this will allow Council to target those areas to ensure cross connections are decommissioned. If this fails, Council requires extensive external assistance.			All cross connections have been identified and removed. Physical checks have been undertaken on the old reticulation main. There is no pressure in the old main.
	RD 6	Taste and odor		stagnation in low use pipelines	Low 1	F/n flushing		Insignificant	Rare	Low 1	Confident					This has not been an issue historically
Whole of System	SY 1	Loss of Supply		Power failure	High 12	Back-up generators on 4 bores, generator at WTP	Regular testing of generators	Catastrophic	Rare	Medium 6	Confident		Develop testing schedule			An inspection, maintenance and testing schedule has been developed and implemented for the Backup generators.
	ST 2	Loss of Supply		Aging infrastructure	High 12	Inspections of reservoirs		Catastrophic	Unlikely	High 10	Estimate		Old stainless-steel reservoir requires condition inspection. Investigate treatment plant pipework, produce schematic		Undertake lifecycle assessment of water supply scheme and investigate future replacement options/ strategies	Old stainless-steel reservoir requires condition inspection - the 2009 Indigenous Environmental Health Infrastructure Program report identified that the then 10-year-old reservoir has a 10-15 year expected asset life. Capacity would be an issue if old reservoir goes off- line. Location and routing of pipework within treatment plant is unknown – Proposed ICCIP project to unearth and map current pipework in Treatment plant Yard
	SY 3	All hazards		Sabotage	High 15	Security fencing at bores and at treatment plant		Catastrophic	Rare	Medium 6	Confident					Security fencing is kept in good repair
	SY 4	All hazards		Inappropriately skilled operators	High 15	Train new operators		Major	Possible	High 12	Confident				Investigate possibilities of other options to train local personnel	Staff turnover is high, difficult to put all staff through training Additional staff were enrolled in appropriate courses
	SY 5	All hazards		operator error	High 15	On the job training		Major	Possible	High 12	Reliable		Develop SOP's for pH, Chlorination, mains break repair, reservoir inspection, recording operational data, sampling/testing		Investigate possibilities of other personnel within council to undertake aspects of sampling	SOP's for pH, Chlorination, mains break repair, reservoir inspection, recording operational data, sampling/testing to be drafted for inclusion into a future management system
	SY 6	All hazards		Natural disaster	High 15	Response to incidents		Major	Possible	High 12	Estimate					Local government disaster management procedure recently tested (due to cyclone)
	SY 7	All hazards		SCADA, IT failures	High 15	Internal maintenance of SCADA system		Major	Possible	High 12	Confident		Investigate upgrades /improvements to SCADA system			**Improvements to SCADA system is being proposed as an ICCIP project** Current SCADA system does not provide sufficient operational control. The pH and chlorine control system are external to the council SCADA, and SCADA is not sending alarms for all key issues. Requires full upgrade of control system and philosophy.
	SY 8	All hazards		Contractors work practices introduce hazards	High 15	Procurement procedure		Major	Possible	High 12	Confident		Contractor management procedure			Ensure suitable close out procedures for all major works. Routinely, external contractors are not delivering the appropriate outcomes. Consider altering contracts to ensure satisfactory project completion.