



Torres Strait Island
REGIONAL COUNCIL

Engineering Services

DRINKING WATER QUALITY MANAGEMENT PLAN

ANNUAL REPORT 2020-21

Torres Strait Island Regional Council
Service Provider SP500

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

Document and Related Information Controller:

ECM Document Number: **297893**

Author	Reviewer	Revision	Date
Paul Ransom	Joshua Dilmetz	1	22/12/2021

Acting Manager Water & Wastewater: Joshua Dilmetz
Phone: 0474 926 824
Email: Joshua.dilmetz@tsirc.qld.gov.au

Table of Contents

Document and Related Information Controller:.....	2
1 Introduction.....	4
2 Summary of Schemes Operated.....	5
3 Implementation of Drinking Water Quality Management Plan.....	7
3.1 Risk Management Improvement Plan.....	7
3.2 Water Operator Training.....	7
3.3 Water Log Sheet Compliance.....	7
3.4 Projects to Improve Water Quality.....	9
4 Verification Monitoring.....	10
4.1 E. coli Results.....	22
5 Events that Affected Water Quality in 2020-2021.....	30
6 Customer Complaints.....	31
6.1 Alleged Illness.....	31
6.2 Colour Complaints.....	31
6.3 Taste and Odour Complaints.....	31
7 DWQMP Audit Findings.....	32
Appendix A.....	33
Hazard and Risk Identification.....	33
Table 1: TSIRC Overview.....	4
Table 2: Scheme Details.....	5
Table 3: Water quality improvement projects.....	9
Table 4: Drinking Water Quality Performance - Verification Monitoring.....	10
Table 5: E. coli Testing Results.....	22
Table 6: Water Quality Failures Reported to Regulator.....	30
Table 7: Customer Complaints.....	31

1 Introduction

This is the Drinking Water Quality Management Plan (DWQMP) Annual Report for Torres Strait Island Regional Council (TSIRC) for the financial year 2020-2021.

TSIRC is a registered service provider, identification (SPID) number 500, serving 4,520 people across 15 communities on 14 islands in the Torres Strait. Implementation of the approved DWQMP ensures safe drinking water to protect public health. An overview of the water services provided by TSIRC are listed in Table 1.

Table 1: TSIRC Overview

Population Served	No. of Raw Water Storage Facilities
4,520	12 Lagoons
No. of Treated Water Storage Facilities	Length of Delivery Mains
19 Reservoirs	105 km
No. of Sampling Locations	No. of Customer Complaints
15 communities x 5 = 75	1

This report summarises compliance with the approved plan over the financial year and includes:

- Activities undertaken during the year in operating the drinking water schemes
- Drinking water quality results for the year
- Summary of events that affected water quality during the year
- DWQMP review findings

This report is submitted to the Queensland Water Supply Regulator (Department of Regional Development, Manufacturing and Water - DRDMW) and is made available to the public through our website or for inspection upon request at council office.

2 Summary of Schemes Operated

Table 2 summarises the drinking water schemes operated by TSIRC.

Table 2: Scheme Details

Scheme Name	Population Served	Connections	Catchment Characteristics	Treatment Process
01 - Boigu	271	93	3 x Desalination Units Lagoon (rainfall)	Clarifier Media Filtration RO Desalination Chlorine Disinfection
02 - Dauan	191	63	4 x Wells Lagoon (rainfall)	Media Filtration Chlorine Disinfection
03 - Saibai	465	109	Lagoon (rainfall) 1 x Desalination Unit (mobile)	Media Filtration Chlorine Disinfection Bag Filtration
04 - Mabuiag	210	53	Lagoon (rainfall)	Media Filtration Chlorine Disinfection
05 - Badu	813	234	3 x Wells (Ground water)	Coagulation (Alum) Media and Ultra Filtration pH adjustment Chlorine Disinfection
06 - Kubin	187	92	1 x Well 1 x Weir Lagoon (rainfall)	Media Filtration Chlorine Disinfection
07 - St Pauls	248	107	3 x Well 1 x Weir 1 x Desalination Units (mobile)	Media Filtration Chlorine Disinfection
08 - Kirriri	268	80	1 x Well Torres Shire Council (TSC) Water Supply	Ultra-Filtration by TSC Media Filtration Chlorine Disinfection Bag filtration

DWQMP Annual Report 2020-2021
ECM # 297893

09 - Iama	319	101	2 x Desalination Units 1 x Desalination Unit (mobile)	Settling Tank Media Filtration RO Desalination
10 - Warraber	245	80	Lagoon (rainfall) 1 x Desalination Unit 1 x Desalination Unit (mobile)	Media Filtration Chlorine Disinfection
11 - Poruma	167	82	1 x Desalination Unit 1 x Desalination Unit (mobile) Lagoon (rainfall)	Settling Tank Media Filtration RO Desalination
12 - Masig	270	109	1 x Desalination Unit 1 x Desalination Unit (mobile) Lagoon (rainfall)	Settling Tank Media Filtration RO Desalination Chlorine Disinfection
13 - Ugar	85	36	2 x Wells Lagoon (rainfall)	Media Filtration Chlorine Disinfection
14 - Erub	328	126	1 x Well Lagoon (rainfall) 1 x Desalination Unit (mobile)	Media and Ultra Filtration Chlorine Disinfection
15 - Mer	453	137	3 x Desalination Unit Lagoon (rainfall)	Settling Tank Media Filtration RO Desalination Bag filtration
<i>Note: Mobile desalination units are listed in the location they were set up on 30 June 2021</i>				

3 Implementation of Drinking Water Quality Management Plan

Implementation of the DWQMP is an ongoing process, and an assessment of the implementation actions in 2020-21 has been undertaken.

The DWQMP has been rewritten for the 2021-22 period. The DWQMP has been reshaped to reflect TSIRC's water management strategy more accurately. It incorporates TSIRC's shift away from paper-based reporting and towards data collection and sharing through SCADA, SWIMS and Smartsheets. The DWQMP Risk Management Improvement Plan (RMIP) has also been reviewed and improved.

Significant improvements have also been implemented in fault and defect management which is reflected in the newly written DWQMP.

3.1 Risk Management Improvement Plan

The Risk Management Improvement Plan (RMIP) captures actions for improving the management of risks identified within the DWQMP. The RMIP is attached to this document as Appendix A.

During early-mid 2020 several significant impacts were experienced as a continued result of Covid-19 pandemic. The most prevalent impacts were due to restrictions in travel and as a result several actions from the RMIP have been deferred. Additional details of completed, deferred and future planned actions under the RMIP are included in Appendix A.

3.2 Water Operator Training

TSIRC did not put any of its Water Officers through Cert II or Cert III training between July 2020 - June 2021. The lack of training undertaken can be partially attributed to difficulties posed by the Covid-19 pandemic.

TSIRC's Technical Officer staff base successfully completed safety training in First Aid, Working at Heights and Working in Confined Spaces in March 2021.

TSIRC's eLearning (online) platform is available and has been utilised for in-house training programs and includes specific training on the DWQMP. During 2020-2021 financial year training for the drinking water quality management plan was completed by multiple staff from across the business including engineering services, environmental and health services, and the executive office.

Since the roll out of the eLearning platform in 2018 additional modules have been included focusing on training in the key aspects of maintenance for filtration, disinfection monitoring, sampling and calibration, water treatment log sheet completion and details on the importance of safe water.

3.3 Water Log Sheet Compliance

Across the course of the 2020-2021 financial year, TSIRC abandoned its paper based logsheet system and has replaced it with the SWIMS.

As of 1 July 2020, all log sheet data is being input directly into the **SWIM Local Operations** database to move away from hand-written logsheets. The transition to SWIMS took place over the financial year and as a result, definitive logsheet compliance data was not captured. Now

DWQMP Annual Report 2020-2021
ECM # 297893

that all communities are reporting via swims, data entry compliance levels can be viewed directly by DRDMW and TSIRC alike through the SWIM program.

3.4 Projects to Improve Water Quality

In addition to items in the RMIP, the following capital projects have been undertaken in 2020-21 demonstrating TSIRC's commitment to improving water quality:

Table 3: Water quality improvement projects

Division	Project	Project Dates
02 - Dauan	WTP Upgrade <ul style="list-style-type: none"> - Increase media filter size to optimise treatment flow rate - Replace media to optimise filtration capacity - Install bag filters Construct New Rising Main - Redirect Well 1, 2 & 3 to lagoon, have 1 treatment location (WTP)	Design phase
03 Saibai	WTP Upgrade <ul style="list-style-type: none"> - Increase media filter size to optimise treatment flow rate 	Complete
04 - Mabuia	WTP Upgrade <ul style="list-style-type: none"> - Increase media filter size to optimise treatment flow rate - Replace media to optimise filtration capacity - Install bag filters 	Design phase
05 -Badu	Construct New Ultra Filtration Plant	Complete
06 - Kubin	WTP Upgrade <ul style="list-style-type: none"> - Increase media filter size to optimise treatment flow rate - Replace media to optimise filtration capacity - Install bag filters 	Design phase
07 - St Pauls	WTP Upgrade <ul style="list-style-type: none"> - Increase media filter size to optimise treatment flow rate - Replace media to optimise filtration capacity - Install bag filters 	Design phase
11 - Poruma	WTP Upgrade <ul style="list-style-type: none"> - Increase media filter size to optimise treatment flow rate - Replace media to optimise filtration capacity - Install bag filters 	Design phase
13 - Ugar	Install Bag Filters at Bore 1 & 2	TBC
14 - Erub	Construct New Ultra Filtration Plant	Complete

4 Verification Monitoring

The approved DWQMP requires 6-monthly sampling for all schemes for metals, nutrients, anions and physical properties. Table 4 summarises the water quality sample results from the Cairns Laboratory.

Table 4: Drinking Water Quality Performance - Verification Monitoring

Scheme name	Parameter	Water quality criteria	No. of samples required to be collected per year**	No. of samples collected and tested	No. of non-compliant samples	Comments
01 - Boigu	Alkalinity	-	2	1	0	
	Calcium	-	0	1	0	
	Chloride	250 mg/L	2	1	0	
	Colour	≤ 15.0 Hu	2	1	0	
	Conductivity	< 1000 μS/cm	2	1	0	
	Fluoride	1.5 mg/L	2	1	0	
	Hardness	60-200 mg/L CaCO ₃	2	1	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	10	1	HPC result of 50 CFU/mL
	Iron	0.3 mg/L	2	1	0	
	Magnesium	-	0	1	0	
	Manganese	< 0.5 mg/L	2	1	0	
	pH	6.5 – 8.5	2	1	1	pH result of 6.3
	Potassium	-	0	1	0	
	Silicon	-	0	1	0	
	Sodium	180 mg/L		1	0	
	Sulphate	≤ 250 mg/L	2	1	0	
	Total Dissolved Salts	-	0	1	0	

DWQMP Annual Report 2020-2021
ECM # 297893

	Turbidity	< 1 NTU	2	1	0	
02 - Dauan	Alkalinity	-	2	1	0	
	Calcium	-	0	1	0	
	Chloride	250 mg/L	2	1	0	
	Colour	≤ 15.0 Hu	2	1	0	
	Conductivity	< 1000 μS/cm	2	1	0	
	Fluoride	1.5 mg/L	2	1	0	
	Hardness	60-200 mg/L CaCO ₃	2	1	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	8	1	1x HPC results were recorded above 20CFU//mL.
	Iron	0.3 mg/L	2	1	0	
	Magnesium	-	0	1	0	
	Manganese	< 0.5 mg/L	2	1	0	
	pH	6.5 – 8.5	2	1	0	
	Potassium	-	0	1	0	
	Silicon	-	0	0	0	
	Sodium	180 mg/L		1	0	
	Sulphate	≤ 250 mg/L	2	1	0	
	Total Dissolved Salts	-	0	1	0	
	Turbidity	< 1 NTU	2	1	1	Turbidity reading of 2.0 NTU
	03 - Saibai	Alkalinity	-	2	0	0
Calcium		-	0	0	0	
Chloride		250 mg/L	2	0	0	
Colour		≤ 15.0 Hu	2	0	0	
Conductivity		< 1000 μS/cm	2	0	0	

DWQMP Annual Report 2020-2021
ECM # 297893

	Fluoride	1.5 mg/L	2	0	0		
	Hardness	60-200 mg/L CaCO ₃	2	0	0		
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	10	1	No E.Coli failures	
	Iron	0.3 mg/L	2	0	0		
	Magnesium	-	0	0	0		
	Manganese	< 0.5 mg/L	2	0	0		
	pH	6.5 – 8.5	2	0	0		
	Potassium	-	0	0	0		
	Silicon	-	0	0	0		
	Sodium	180 mg/L		0	0		
	Sulphate	≤ 250 mg/L	2	0	0		
	Total Dissolved Salts	-	0	0	0		
	Turbidity	< 1 NTU	2	0	0		
	04 - Mabuia	Alkalinity	-	2	1	0	
		Calcium	-	0	2	0	
Chloride		250 mg/L	2	1	0		
Colour		≤ 15.0 Hu	2	1	0		
Conductivity		< 1000 μS/cm	2	1	0		
Fluoride		1.5 mg/L	2	1	0		
Hardness		60-200 mg/L CaCO ₃	2	2	0		
Heterotrophic Plate Count (HPC)		20 – 200 /mL	2	11	1		
Iron		0.3 mg/L	2	2	0		
Magnesium		-	0	2	0		

DWQMP Annual Report 2020-2021
ECM # 297893

	Manganese	< 0.5 mg/L	2	2	0	
	pH	6.5 – 8.5	2	1	1	
	Potassium	-	0	2	0	
	Silicon	-	0	0	0	
	Sodium	180 mg/L		2	0	
	Sulphate	≤ 250 mg/L	2	1	0	
	Total Dissolved Salts	-	0	1	0	
	Turbidity	< 1 NTU	2	1	0	
05 - Badu	Alkalinity	-	2	1	0	
	Calcium	-	0	1	0	
	Chloride	250 mg/L	2	1	0	
	Colour	≤ 15.0 Hu	2	1	0	
	Conductivity	< 1000 µS/cm	2	1	0	
	Fluoride	1.5 mg/L	2	1	0	
	Hardness	60-200 mg/L CaCO ₃	2	1	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	11	0	
	Iron	0.3 mg/L	2	1	0	
	Magnesium	-	0	1	0	
	Manganese	< 0.5 mg/L	2	1	0	
	pH	6.5 – 8.5	2	0	0	A raw water sample was taken with a pH of 4.8 however pH is corrected through the treatment process.
	Potassium	-	0	1	0	
	Silicon	-	0	1	0	
	Sodium	180 mg/L		1	0	
Sulphate	≤ 250 mg/L	2	1	0		

DWQMP Annual Report 2020-2021
ECM # 297893

	Total Dissolved Salts	-	0	1	0		
	Turbidity	< 1 NTU	2	1	0		
06 - Kubin	Alkalinity	-	2	0	0		
	Calcium	-	0	0	0		
	Chloride	250 mg/L	2	0	0		
	Colour	≤ 15.0 Hu	2	0	0		
	Conductivity	< 1000 μS/cm	2	0	0		
	Fluoride	1.5 mg/L	2	0	0		
	Hardness	60-200 mg/L CaCO ₃	2	0	0		
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	10	2	1x reading of 40 at the school sample point, 1x reading of 170 at the WTP. No E.coli detected.	
	Iron	0.3 mg/L	2	0	0		
	Magnesium	-	0	0	0		
	Manganese	< 0.5 mg/L	2	0	0		
	pH	6.5 – 8.5	2	0	1		
	Potassium	-	0	0	0		
	Silicon	-	0	0	0		
	Sodium	180 mg/L		0	0		
	Sulphate	≤ 250 mg/L	2	0	0		
	Total Dissolved Salts	-	0	0	0		
	Turbidity	< 1 NTU	2	0	0		
	07 – St Pauls	Alkalinity	-	2	2	0	
		Calcium	-	2	2	0	
Chloride		250 mg/L	2	2	0		
Colour		≤ 15.0 Hu	2	2	0		

DWQMP Annual Report 2020-2021
ECM # 297893

	Conductivity	< 1000 µS/cm	2	2	0	
	Fluoride	1.5 mg/L	2	2	0	
	Hardness	60-200 mg/L CaCO ₃	2	2	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	11	1	1x reading of 40 at the school sample point, 1x reading of 170 at the WTP. No E.coli detected.
	Iron	0.3 mg/L	2	2	0	
	Magnesium	-	2	2	0	
	Manganese	< 0.5 mg/L	2	2	0	
	pH	6.5 – 8.5	2	2	0	
	Potassium	-	0	2	0	
	Silicon	-	0	2	0	
	Sodium	180 mg/L	2	2	0	
	Sulphate	≤ 250 mg/L	2	2	0	
	Total Dissolved Salts	-	2	2	0	
	Turbidity	< 1 NTU	2	2	0	
08 - Hammond	Alkalinity	-	2	3	0	
	Calcium	-	0	3	0	
	Chloride	250 mg/L	2	3	0	
	Colour	≤ 15.0 Hu	2	3	0	
	Conductivity	< 1000 µS/cm	2	3	1	1x conductivity reading =1000 µS/cm. the other readings were between 100-200.
	Fluoride	1.5 mg/L	2	3	0	
	Hardness	60-200 mg/L CaCO ₃	2	3	0	

DWQMP Annual Report 2020-2021
ECM # 297893

	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	14	0	
	Iron	0.3 mg/L	2	3	0	
	Magnesium	-	0	3	0	
	Manganese	< 0.5 mg/L	2	3	0	
	pH	6.5 – 8.5	2	3	1	1x reading of 9.9
	Potassium	-	0	3	0	
	Silicon	-	0	3	0	
	Sodium	180 mg/L		3	0	
	Sulphate	≤ 250 mg/L	2	3	0	
	Total Dissolved Salts	-	0	3	0	
	Turbidity	< 1 NTU	2	3	1	Turbidity reading of 1.9 NTU
09 - Iama	Alkalinity	-	2	2	0	
	Calcium	-	0	2	0	
	Chloride	250 mg/L	2	2	1	1x reading of 300mg/L
	Colour	≤ 15.0 Hu	2	2	0	
	Conductivity	< 1000 μS/cm	2	2	1	1x conductivity reading =1100 μS/cm. RO membranes were replaced after result.
	Fluoride	1.5 mg/L	2	2	0	
	Hardness	60-200 mg/L CaCO ₃	2	2	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	10	2	1x reading of 30 at the school sample point, 1x reading of 140 at the WTP. No E.coli detected.
	Iron	0.3 mg/L	2	2	0	
	Magnesium	-	0	2	0	
	Manganese	< 0.5 mg/L	2	2	0	
	pH	6.5 – 8.5	2	2	0	

DWQMP Annual Report 2020-2021
ECM # 297893

	Potassium	-	0	2	0	
	Silicon	-	0	2	0	
	Sodium	180 mg/L		2	1	1x reading of 200mg/L at the WTP
	Sulphate	≤ 250 mg/L	2	2	0	
	Total Dissolved Salts	-	0	2	0	
	Turbidity	< 1 NTU	2	2	0	
10 - Warraber	Alkalinity	-	2	0	0	
	Calcium	-	0	0	0	
	Chloride	250 mg/L	2	0	0	
	Colour	≤ 15.0 Hu	2	0	0	
	Conductivity	< 1000 µS/cm	2	0	0	
	Fluoride	1.5 mg/L	2	0	0	
	Hardness	60-200 mg/L CaCO ₃	2	0	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	9	0	
	Magnesium	-	2	0	0	
	pH	6.5 – 8.5	0	0	0	
	Potassium	-	2	0	0	
	Silicon	-	2	0	0	
	Sodium	180 mg/L	0	0	0	
	Sulphate	≤ 250 mg/L	0	0	0	
	Total Dissolved Salts	-		0	0	
	Turbidity	< 1 NTU	2	0	0	
11 - Poruma	Alkalinity	-	2	1	0	
	Calcium	-	0	1	0	
	Chloride	250 mg/L	2	1	0	

DWQMP Annual Report 2020-2021
ECM # 297893

	Colour	≤ 15.0 Hu	2	1	0	
	Conductivity	< 1000 μS/cm	2	1	0	
	Fluoride	1.5 mg/L	2	1	0	
	Hardness	60-200 mg/L CaCO ₃	2	1	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	15	1	1x reading of 150HPC, positive results for eColi also. A BWA was put in place for this incident.
	Iron	0.3 mg/L	2	1	0	
	Magnesium	-	0	1	0	
	Manganese	< 0.5 mg/L	2	1	0	
	pH	6.5 – 8.5	2	1	0	
	Potassium	-	0	1	0	
	Silicon	-	0	1	0	
	Sodium	180 mg/L		1	0	
	Sulphate	≤ 250 mg/L	2	1	0	
	Total Dissolved Salts	-	0	1	0	
	Turbidity	< 1 NTU	2	1	0	
12 - Masig	Alkalinity	-	2	0	0	
	Calcium	-	0	0	0	
	Chloride	250 mg/L	2	0	0	
	Colour	≤ 15.0 Hu	2	0	0	
	Conductivity	< 1000 μS/cm	2	0	0	
	Fluoride	1.5 mg/L	2	0	0	
	Hardness	60-200 mg/L CaCO ₃	2	0	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	5	0	

DWQMP Annual Report 2020-2021
ECM # 297893

	Iron	0.3 mg/L	2	0	0	
	Magnesium	-	0	0	0	
	Manganese	< 0.5 mg/L	2	0	0	
	pH	6.5 – 8.5	2	0	1	
	Potassium	-	0	0	0	
	Silicon	-	0	0	0	
	Sodium	180 mg/L		0	0	
	Sulphate	≤ 250 mg/L	2	0	0	
	Total Dissolved Salts	-	0	0	0	
	Turbidity	< 1 NTU	2	0	0	
13 - Erub	Alkalinity	-	2	4	0	
	Calcium	-	0	4	0	
	Chloride	250 mg/L	2	4	0	
	Colour	≤ 15.0 Hu	2	4	0	There are considerable colour issues with the raw water supply at Erub, especially the water collected from the Mogor well. Raw water samples typically have a colour reading of 60-70 Pt/Co. once treated through uF colour drops to approx. 8-14 Pt/Co
	Conductivity	< 1000 μS/cm	2	4	0	
	Fluoride	1.5 mg/L	2	4	0	
	Hardness	60-200 mg/L CaCO ₃	2	4	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	18	3	3x HPC results were recorded above 20CFU//mL. Erub is on an ongoing Boiled Water Notice as they transition from RO to uF water supply.
	Iron	0.3 mg/L	2	4	0	

DWQMP Annual Report 2020-2021
ECM # 297893

	Magnesium	-	0	4	0	
	Manganese	< 0.5 mg/L	2	0	0	
	pH	6.5 – 8.5	2	4	0	
	Potassium	-	0	4	0	
	Silicon	-	0	4	0	
	Sodium	180 mg/L		4	0	
	Sulphate	≤ 250 mg/L	2	4	0	
	Total Dissolved Salts	-	0	0	0	
	Turbidity	< 1 NTU	2	4	0	
15 - Mer	Alkalinity	-	2	2	0	
	Calcium	-	0	2	0	
	Chloride	250 mg/L	2	2	1	1x result of 260mg/L
	Colour	≤ 15.0 Hu	2	1	0	
	Conductivity	< 1000 µS/cm	2	2	0	
	Fluoride	1.5 mg/L	2	2	0	
	Hardness	60-200 mg/L CaCO3	2	2	0	
	Heterotrophic Plate Count (HPC)	20 – 200 /mL	2	25	9	Mer water supply results in a HPC above 20CFU/mL approx. 50% of the time. We anticipate that this will decrease now that water shutoff is no longer happening 3 times a day and pipelines are constantly primed.
	Iron	0.3 mg/L	2	2	0	
	Magnesium	-	0	1	0	

DWQMP Annual Report 2020-2021
ECM # 297893

Manganese	< 0.5 mg/L	2	2	0	
pH	6.5 – 8.5	2	2	1	
Potassium	-	0	2	0	
Silicon	-	0	2	0	
Sodium	180 mg/L		2	0	
Sulphate	≤ 250 mg/L	2	2	0	
Total Dissolved Salts	-	0	0	0	
Turbidity	< 1 NTU	2	2	0	
*(i.e. ADWG health guideline value) **(per approved DWQMP)					

Interim facilities for monitoring and testing were established to mitigate impacts to water services during the Covid-19 pandemic. Due to logistical issues the six-monthly testing for Ugar have not been included. The testing has been re-scheduled for Ugar.

4.1 E. coli Results

Table 5 below summarises the E. coli results for the year to June 2020. Compliance is similar, with 12 out of the 15 schemes having 100% of samples complying at the end of the year which is comparable to 13 out of 15 in 2019 and an improvement on 11 in 2018 and 9 in 2017.

Table 5: E. coli Testing Results

Drinking Water Scheme	01 - Boigu											
Year	2020 - 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	1	2	3	4	5	6	7	8	9	10	11	12
No. of samples collected in which E. coli is detected (i.e. a failure)	5	0	5	5	0	5	0	5	5	0	5	5
No. of samples collected in previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
No. of failures for previous 12 month period	40	40	40	45	40	45	40	45	45	40	40	40
% of samples that comply	0	0	0	0	0	0	0	0	0	0	0	0
Compliance with 98% annual value	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

DWQMP Annual Report 2020-2021
ECM # 297893

Drinking Water Scheme	02 - Dauan											
Year	2020 - 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	5	0	5	5	0	0	0	5	0	0	0
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	36	41	41	43	44	44	39	35	35	35	30	25
No. of failures for previous 12 month period	1	1	1	1	0	0	0	0	0	0	0	0
% of samples that comply	97%	98%	98%	98%	100%	100%	100%	100%	100%	100%	100%	100%
Compliance with 98% annual value	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Drinking Water Scheme	03 - Saibai											
Year	2020 - 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	5	5	0	5	0	5	5	0	5	5
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	34	34	34	35	30	30	30	35	40	35	35	40
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

DWQMP Annual Report 2020-2021
ECM # 297893

Drinking Water Scheme	04 - Mabuiaq											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	5	0	5	5	0	0	5	5	0	5
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	29	29	34	29	34	34	29	29	34	35	30	35
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

Drinking Water Scheme	06 - Kubin											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	5	0	5	5	0	5	5	0	5	5
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	35	35	40	35	35	35	30	35	35	30	35	40
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

DWQMP Annual Report 2020-2021
ECM # 297893

Drinking Water Scheme	05 - Badu											
Year	2020 - 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	0	5	5	0	5	5	0	5	5	5	5	5
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	35	40	45	40	45	45	40	40	40	40	40	45
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

Drinking Water Scheme	07 - St Pauls											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	0	0	5	5	0	5	5	0	5	5
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	1	0	0	
No. of samples collected in previous 12 month period	35	35	35	30	30	35	30	35	35	30	30	35
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	1	1	1	1
% of samples that comply	100%	100%	100%	100%	100%	100%	100%	100%	97%	97%	97%	97%
Compliance with 98% annual value	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No

Drinking Water Scheme	08 - Hammond											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	0	0	5	5	5	5	0	5	0	5
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	14	14	14	14	19	24	29	34	29	30	30	35
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

Drinking Water Scheme	09 - Iama											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	0	0	5	5	0	5	0	5	0	5
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	35	35	35	30	30	30	30	30	30	30	25	30
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

DWQMP Annual Report 2020-2021
ECM # 297893

Drinking Water Scheme	10 - Warraber											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	5	5	0	5	0	5	0	0	0	5
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	45	45	50	50	45	45	40	40	40	35	30	30
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

Drinking Water Scheme	11 - Poruma											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	5	0	5	5	5	5	0	5	5	5
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	40	40	45	40	45	45	45	50	45	45	45	45
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

Drinking Water Scheme	12 - Masig											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	5	5	5	5	5	5	5	5	5	5	5
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	45	50	55	55	60	60	60	60	60	60	60	60
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

Drinking Water Scheme	13 - Ugar											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	0	0	0	0	5	0	0	0	5	0	0
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	35	35	30	25	20	20	20	15	15	20	15	15
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

DWQMP Annual Report 2020-2021
ECM # 297893

Drinking Water Scheme	14 - Erub											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	0	5	0	5	5	0	5	0	5	5	5	5
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	1	0	0	0	0	0
No. of samples collected in previous 12 month period	35	40	35	35	35	35	40	35	35	35	35	40
No. of failures for previous 12 month period	1	1	1	1	0	0	1	1	1	1	1	1
% of samples that comply	97%	98%	97%	97%	100%	100%	97.5%	97.1%	97.1%	97.1%	97.1%	97.5%
Compliance with 98% annual value	No	No	No	No	Yes	Yes	No	No	No	No	No	No

Drinking Water Scheme	15 - Mer											
Year	2020 – 2021											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	5	5	5	5	5	5	5	5	5	0	5
No. of samples collected in which E. coli is detected (i.e. a failure)	2	0	0	0	0	0	0	0	0	0	0	1
No. of samples collected in previous 12 month period	50	55	60	60	60	60	60	60	60	60	55	55
No. of failures for previous 12 month period	5	5	5	5	5	5	5	5	5	5	3	3
% of samples that comply	90%	91%	92%	92%	92%	92%	92%	92%	92%	92%	95%	95%
Compliance with 98% annual value	No	No	No	No	No	No	No	No	No	No	No	No

5 Events that Affected Water Quality in 2020-2021

Table 6 summarises the drinking water events that occurred during the reporting period from 1 July 2020 to 30 June 2021.

Table 6: Water Quality Failures Reported to Regulator

Incident Number	Incident Date	Location	Parameter Failure / Issue	Incident Response Steps
DWI-500-21-08890	25/02/2021	St Pauls	E coli	Resamples collected and chlorine and log sheet data checked. Boiled Water Alert issued until tests confirmed negative results. Alert was lifted on 27/05/20.
DWI-500-21-08848	15/01/2021	Erub	E coli	Erub community already on BWA. BWA notice recirculated throughout community. Follow up testing not required. BWA remains in place on island, Community water supply is currently being solely supplied by RO filtration.
DWI-5000-20-08422	15/09/2020	Mer	E coli	Resamples collected and chlorine and log sheet data checked. Boiled Water Alert issued until tests confirmed negative results. Alert was lifted on 04/06/2020.
DWI-500-20-08520	5/09/2020	Mer	Equipment failure	Follow up with staff to determine correct procedures for desalination unit. Check valve to prevent operator error installed.
DWI-500-20-08472	16/07/2020	Mer	E coli	Resamples collected and chlorine and log sheet data checked. Boiled Water Alert issued until tests confirmed negative results. Alert was lifted on 14/08/20.

6 Customer Complaints

Complaints are managed in accordance with the TSIRC Complaints Management Procedure. A complaints register has been developed to capture any complaints in relation to key water quality components, such as health, aesthetics, taste and odour. In the 2020-21 year only one formal complaint was received by TSIRC Management which has been listed in Table 7 below, the lack of complaints is likely due to a lack of understanding and training in the area for water officers and other council staff.

Training will be developed in the 2020-21 period for water officers on how to handle complaints received from the community, especially verbally, to ensure data is captured and recorded in the fault management database. Water Officers are prompted to notify management of complaints on weekly log sheets.

Table 7: Customer Complaints

Scheme Name	Health Concern	Dirty Water	Taste and Odour	Other
Erub	1	0	0	0
Total	1	0	0	0

6.1 Alleged Illness

Alleged illness complaints are received from customers who believe their water supply is the cause of an illness. In these cases, recent laboratory samples are reviewed to supply information to the customer to reassure the water supply is meeting the Australian Drinking Water guidelines for health-related parameters. During 2020-21, there was no confirmed illness due to drinking water supplied to the community.

6.2 Colour Complaints

Discoloured water can predominantly be attributed to emergency works being conducted on the water mains in the area. A change in flow direction can cause sediment to be disturbed in the pipe and push this into legs of water meters at resident's properties. While Water and Wastewater team endeavours to plan works were possible and deliver letters to residents explaining works, duration of time without water and potential effects such as dirty/milky water after the water is returned to service, emergencies still occur that require urgent attention and cannot be planned.

Water and Wastewater staff advise residents to run external taps to flush any dirty water trapped in their connection and if the water is still discoloured, Water and Wastewater staff return to the area and flush the delivery mains again.

No colour complaints were received in the 2020/2021 financial year.

6.3 Taste and Odour Complaints

The taste and odour complaints received are often related to chlorine in the network. Individual customers have very different tolerance levels and while as low as possible, this can be detected by customers with very sensitive taste and smell.

Chlorine can also react with organics in the pipe network, be affected by periods of low flow and temperature in the pipe network.

Water and Wastewater staff investigate all chlorine complaints and if recent results are not available for that area from daily testing, officers will attend the location and take a chlorine reading using a handheld chlorine meter.

7 DWQMP Audit Findings

An audit was conducted during the reporting period 1 July 2020 to 30 June 2021. The DWQMP has been rewritten to align with TSIRC's current water management strategy. The revised DWQMP has been submitted to the Department of Regional Development Manufacturing and Water (DRDMW) for review in September 2021.

Appendix A

Hazard and Risk Identification

K.1 - Risk Assessment Team

Review and Year	Participant	Position	Qualifications / Expertise	Role in Assessment
Original 2013	Patrick McGuire	Executive Manager Engineering Services	MIEAust, CPEng, RPEQ, DipTech Mgt, 44 years water infrastructure experience	Review of Identified hazards and risk levels.
Original 2013	Mathew Brodbeck	Manager Water and Wastewater	11 Years experience managing water supplies.	Hazard Identification & Assessment
Original 2013	Corin Yong	Infrastructure Support Engineer	20 years mechanical engineering experience, 2 years experience managing water supplies,	Hazard Identification & Assessment
Original 2013	Dr Anne Gardiner	Principal Scientist	PhD Urban Water Management. OWSR Advisor	Hazard Identification & Assessment
Original 2013	Bruce Stedman	Indigenous Advisor	Aboriginal and Torres Strait Islander Advisor to Department of Energy and Water Supply, awareness of indigenous culture	Hazard Identification & Assessment
Original 2013	Ralph Pearson Bann	Technical Officer Plumber	Trade Qualified Highly Experience & extensive knowledge of Water Supply System	Review of Identified hazards and risk levels.
Original 2013	Mark David	Operations Manager Water	Cert III Water Operations	Review of Identified hazards and risk levels.
Original 2013	Paul Dai	DEO	Cert III Water Operations	Review of Identified hazards and risk levels.
Original 2013	Anson Gibia	MSEO Water	Cert III Water Operations	Review of Identified hazards and risk levels.
Original 2013	Amanda Pearce	Administration Water and Wastewater	Extensive local knowledge and experience.	Review of Identified hazards and risk levels.
Rev 1, 2016	Matt Payne	Engineer AECOM	3 Years experience working with Local Government, Water and Waste	Co-ordinate assessment, document changes
Rev 1, 2016	Tom Day	Manager Water and Sewerage)	Mechanical Engineer, 6 years experience	Review of existing risks and ensure they are up to date
Rev 2, 2017	Daniel Harrington	Engineer Water and Wastewater	Engineer Water and Wastewater	Full Review of Risk assessment
Rev 2, 2017	Toni Veronese	Manager Water and Wastewater	Manager Water and Wastewater	Full review of Management Plans, and review of risk assessment
Rev 3, 2019	Emma Evans	Water and Wastewater Compliance Engineer	Water and Wastewater Compliance Engineer	Full Review of Risk assessment
Rev 3, 2019	Paul Ransom	Water and Wastewater Engineer	Water and Wastewater Engineer	Full Review of Risk assessment
Rev 3, 2019	Daniel Harington	Manager Water and Wastewater	Manager Water and Wastewater	Full Review of Risk assessment
Rev 4, 2021	Paul Ransom	Manager Water and Wastewater	Bachelor of Engineering	Full review of Management Plans, and review of risk assessment
Rev 4, 2021	Joshua Dilmetz	Water and Wastewater Engineer	Bachelor of Engineering	Full review of Management Plans, and review of risk assessment
Rev 4, 2021	Patrick Whittington	SCADA Technician and Data Analyst	Extensive water operations experience	Full Review of Risk assessment
Rev 4, 2021	Samantha Guy	Water and Wastewater Compliance Engineer	Bachelor of Engineering	Full Review of Risk assessment
Rev 4, 2021	Daniel Harington	Senior Project Engineer	Bachelor of Engineering	Full Review of Risk assessment
Rev 4, 2021	Matthew Brodbeck	Manager Engineering Operations	Manager Engineering Operations, extensive local knowledge and experience	Full Review of Risk assessment
Rev 4, 2021	Bernard Dorante	Engineering Operations Supervisor	Extensive local knowledge and experience	Full Review of Risk assessment
Rev 4, 2021	Robert See Kee	Engineering Operations Supervisor	Extensive local knowledge and experience	Full Review of Risk assessment

K.2 - Risk Assessment Matrix

Likelihood	Consequence				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
5 Almost Certain	2 - Medium	2 - Medium	3 - High	3 - High	4 - Extreme
4 Likely	1 - Low	2 - Medium	2 - Medium	3 - High	4 - Extreme
3 Possible	1 - Low	2 - Medium	2 - Medium	3 - High	3 - High
2 Unlikely	1 - Low	1 - Low	2 - Medium	2 - Medium	3 - High
1 Rare	1 - Low	1 - Low	1 - Low	2 - Medium	2 - Medium

This matrix has been extracted from the Torres Strait Island Regional Council - Enterprise and Risk Management Guidelines Document

Likelihood	Description	Definition - Likelihood of Occurrence/Frequency
1 Rare	Evidence: Nobody has ever heard of it happening. History: Has not happened previously in our industry, but is a conceivable occurrence.	Once every 100 years
2 Unlikely	Evidence: Never heard of it, but it sounds like something that I know has happened elsewhere before.	Once every 50 years
3 Possible	Evidence: Similar event occurred, not sure when/where/more than one occasion. History: Logged at least once within our organisation/previous employer(s).	Once every 10 years
4 Likely	Evidence: Similar event occurred several times over the years. History: Logged several times in our organisation or my previous employer(s).	Once every 5 years
5 Almost certain	Evidence: People are strongly aware of the risk occurring on several occasions. History: Logged regularly in this area and others on site, a known industry issue.	Once every 2 years

This table has been extracted from the Torres Strait Island Regional Council - Enterprise and Risk Management Guidelines Document

Consequence	Descriptions
1 Insignificant	An event, where the impact can be absorbed; no injuries; low financial loss
2 Minor	An event, the consequences of which can be absorbed but management effort is required to minimise the impact; first aid treatment; low-medium financial loss
3 Moderate	A significant event, which can be managed under normal circumstances; medical treatment; medium financial loss
4 Major	A critical event, which with proper management can be continued; extensive injuries; loss of production capability; major financial loss
5 Catastrophic	A disaster, which could lead to the collapse of the organisation; death; huge financial loss

This table has been extracted from the Torres Strait Island Regional Council - Enterprise and Risk Management Guidelines Document

K.3 - Consequence Matrix

Consequence	Rating	Finance and Economic	Human Resources	Infrastructure & Assets	Legal Compliance, Regulatory & Liability (Inc. Environment)	Reputation/Political	Service Delivery	Management Effort/Climate Change Impact
Catastrophic	5	Huge financial loss (e.g. > \$1M of revenue or budget)	Fatality or significant irreversible disability. Staff issues cause continuing failure to deliver essential services.	Widespread, long term reduction in service capacity of substantial key assets and infrastructure. Threat to viability of services or operation.	Extensive breach involving multiple individuals. Extensive fines and litigation with possible class action. DLG review or Administrator appointed.	Loss of State Government support with scathing criticism and removal of the council. National media exposure. Loss of power and influence restricting decision making and capabilities.	The continuing failure of Council to deliver essential services. Substantial loss of operating capacity > 1 week. The removal of key revenue generation.	A critical event or disaster that could lead to the collapse of the business.
Major	4	Major financial loss (eg. \$250,001 to \$1M of revenue or budget)	Extensive injuries. Lost time of more than 14 working days. Staff issues cause widespread failure to deliver several major strategic objectives and long-term failure of day to day service delivery.	Widespread, medium to long term reduction in service capacity of key assets and infrastructure. Loss or event may require replacement of key property or infrastructure.	Major breach with possible fines or litigation. DLG or Administrator may be involved. Critical failure of internal controls, may have significant and major financial impact.	State media and public concern/ exposure with adverse attention and long-term loss of support from shire residents. Adverse impact and intervention by State Government.	Widespread failure to deliver several major strategic objectives and service plans. Long-term failure of Council causing lengthy service interruption up to 1 week.	A critical event that with appropriate management can be overcome.
Moderate	3	High financial loss (e.g. \$50,001 to \$250,000 of revenue or budget)	Medical treatment. Lost time of up to 14 working days. Staff issues cause failure to deliver minor strategic objectives and temporary and recoverable failure of day to day service delivery.	Short to medium term reduction in service capacity of key assets and infrastructure. Loss with temporary disruption of key facility and services.	Serious breach involving statutory authorities or investigation. Prosecution possible with significant financial impact. Possible DLG involvement. Moderate impact of legislation/regulations	Significant state-wide concern/ exposure and short to mid-term loss of support from shire residents. Adverse impact and intervention by another local government & LGAQ.	Failure to deliver minor strategic objectives and service plans. Temporary & recoverable failure of Council causing intermittent service interruption for a week.	A significant event which can be managed under normal circumstances.
Minor	2	Minor financial loss (e.g. \$10,001 to \$50,000 of revenue or budget)	First aid treatment. No lost time. Staff issues cause several days interruption of day to day service delivery.	Minor loss/damage with limited downtime. Repairs required through normal operations.	Minor breach with no fine or litigation. Contained non-compliance or breach with short term significance with minor impact. Some impact on normal operations.	Minor local community concern manageable through good public relations. Adverse impact by another local government.	Temporary and recoverable failure of Council causing intermittent service interruption up to 24 hrs.	An event, the impact of which can be absorbed, but management effort is needed.
Insignificant	1	Low financial loss (e.g. < \$10,000 of revenue or budget)	No injury. Staff issues cause negligible impact of day to day service delivery.	Isolated or minimal damage where repairs are required however facility or infrastructure is still operational.	Isolated non-compliance or breach. Minimal failure managed by normal operations. Insignificant impact of legislation/regulations.	Transient matter, e.g. Customer complaint, resolved in day-to-day management. Negligible impact from another local government.	Negligible impact of Council, brief service interruption for several hours to a day.	An event, the impact of which can be absorbed through normal activity.

This matrix has been extracted from the Torres Strait Island Regional Council - Enterprise and Risk Management Guidelines Document

K.4 - Risk Assessment

ID #	Location	Hazardous Event	Hazard	Scheme	Likelihood	Consequence	Maximum Risk Ranking	Preventative Measures	Residual Likelihood	Residual Consequence	Residual Risk Ranking	RMIP	Notes
0.01	Distribution	Mains Break	High turbidity	All	5 Almost Certain	2 Minor	2 - Medium	Mains are flushed after repairs Week day turbidity monitoring in the network at 5 set locations	5 Almost Certain	2 Minor	2 - Medium	-	
0.02	System	Communication failures	Damage to plant Poor operational performance Incidents	All	5 Almost Certain	2 Minor	2 - Medium	Continual monitoring of SCADA network, to identify failures. Multiple forms of communication: mobile, email, land lines. History of acceptable communication levels.	5 Almost Certain	2 Minor	2 - Medium	-	
0.03	System	Staff Shortages	Damage to plant Poor operational performance Incidents Lack of maintenance	All	5 Almost Certain	2 Minor	2 - Medium	Leave Management Process Potential for staff to be relocated to other communities to operate system if required.	5 Almost Certain	2 Minor	2 - Medium	-	
0.04	System	Lack of skilled employees	Damage to plant Poor operation Incidents Lack of maintenance	All	5 Almost Certain	4 Major	3 - High	DWQMP Appendix I - Training Management Plan SCADA monitoring and automated chlorine dosing Automation of plants to ensure continuous operation without operator input	5 Almost Certain	4 Major	3 - High	-	
0.05	System	Interference/disruption of SCADA - intentional	Loss of monitoring ability and alarming Data loss Poor plant performance Incidents	All	3 Possible	3 Moderate	2 - Medium	Daily monitoring of SCADA system Physical presence at WTP and STP on week days	3 Possible	3 Moderate	2 - Medium	WS-11	
0.06	System	Interference/disruption of SCADA - unintentional	Loss of monitoring ability and alarming Data loss Poor plant performance Incidents	All	3 Possible	3 Moderate	2 - Medium	Daily monitoring of SCADA system Physical presence at WTP and STP on week days	3 Possible	3 Moderate	2 - Medium	WS-11	
0.07	System	Interference/disruption of SCADA - unauthorised access	Loss of monitoring ability and alarming Data loss Poor plant performance Incidents	All	3 Possible	4 Major	3 - High	Daily monitoring of SCADA system Physical presence at WTP and STP on week days Firewall / Penetration Testing Teamviewer	3 Possible	4 Major	3 - High	WS-12	
0.08	System	Abuse/corruption/ransomware/malware of cyber information	Data loss Lack of ability to supply drinking water	All	4 Likely	5 Catastrophic	4 - Extreme	Virusprotection Firewall	4 Likely	5 Catastrophic	4 - Extreme	-	
0.09	System	Lack of physical security over online assets	Damage to or loss of online assets	All	5 Almost Certain	3 Moderate	3 - High	Physical presence at WTP and STP on weekdays Minor physical security barriers such as fences to key assets Reporting of suspected incidents	5 Almost Certain	3 Moderate	3 - High	-	
0.10	System	Lack of access control and identity management	Loss of monitoring ability and alarming. Data loss	All	5 Almost Certain	3 Moderate	3 - High	-	5 Almost Certain	3 Moderate	3 - High	WS-11	
0.11	System	Lack of protective technology and its maintenance	Loss of monitoring ability and alarming. Data loss Poor plant performance Incidents	All	2 Unlikely	4 Major	2 - Medium	Virusprotection, firewall, IT team managed	2 Unlikely	4 Major	2 - Medium	-	
0.12	System	Lack of ability to detect if a cyber security event has occurred	Loss of monitoring ability and alarming. Data loss Poor plant performance Incidents	All	5 Almost Certain	5 Catastrophic	4 - Extreme	Virusprotection, firewall, IT team managed	3 Possible	5 Catastrophic	3 - High	-	
0.13	System	Climate Change	Existential threat to operations	All	5 Almost Certain	5 Catastrophic	4 - Extreme	Nil	5 Almost Certain	5 Catastrophic	4 - Extreme	-	
0.14	System	Inability to supply treated water	Loss of access to chemical treatment	All	2 Unlikely	4 Major	2 - Medium	Nil / BWA	2 Unlikely	3 Moderate	2 - Medium	-	
0.15	System	False Positive	E.coli	All	5 Almost Certain	3 Moderate	3 - High	Multiple island based E.coli test stations	5 Almost Certain	3 Moderate	3 - High	WS-06	
0.16	System	Inability to test water parameters on island	Consumable shortages	All	5 Almost Certain	2 Minor	2 - Medium	Nil	5 Almost Certain	2 Minor	2 - Medium	WS-15	
1.01	Catchment (Saltwater intake line)	Loss of Critical Water Supply	High Turbidity	1 - Boigu	2 Unlikely	2 Minor	1 - Low	Lagoon on island to provide interim short term water supply	1 Rare	2 Minor	1 - Low	-	
1.02	Catchment (Saltwater intake line)	Poor Water Quality	Petroleum/chemical contamination of seawater	1 - Boigu	2 Unlikely	4 Major	2 - Medium	Seawater intake line is located out under jetty, approx 50m from shore Visual inspections of area only Notification of incident from barge operator and shut down plant upon notification	1 Rare	4 Major	2 - Medium	-	

K.4 - Risk Assessment

1.03	Catchment (Saltwater intake line)	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	1 - Boigu	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
1.04	WTP	Ineffective Treatment	High Chlorine residual	1 - Boigu	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
1.05	WTP	Ineffective Treatment	Low Chlorine residual	1 - Boigu	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
1.06	WTP	Ineffective Treatment	Turbidity	1 - Boigu	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
1.07	WTP	Ineffective Treatment	E.coli	1 - Boigu	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
1.08	WTP	Ineffective Treatment	Crypto, Giardia	1 - Boigu	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
1.09	WTP - RO Unit	Ineffective Treatment	High Dissolved Solids	1 - Boigu	5 Almost Certain	2 Minor	2 - Medium	Week day conductivity monitoring for each RO Unit, raw water and treated water RO Unit flushing and membrane changes completed as required	5 Almost Certain	2 Minor	2 - Medium	-	
1.10	System	Water Security	Loss of critical supplies	1 - Boigu	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
1.11	System	Bushfire	Damage to Assets	1 - Boigu	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Buried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
1.12	Lagoon	Bushfire	Damage to assets	1 - Boigu	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
1.13	Lagoon	Pathogen and Microbial Contaminant	Contamination of storage supply	1 - Boigu	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon Catchment fenced and inspections carried out weekly. Cleaning of covers pre wet season and post wetseason, as needed during year First flush water is bypassed off lagoon covers Monthly E.coli testing	5 Almost Certain	1 Insignificant	2 - Medium	WS-01	
1.14	Sea Wall	Salt Water Inundation	Contamination of storage supply	1 - Boigu	3 Possible	4 Major	3 - High	Boigu sea wall	2 Unlikely	4 Major	2 - Medium	-	
1.15	Jetty	Jetty Collapse	Loss of critical supplies	1 - Boigu	4 Likely	4 Major	3 - High	Nil	4 Likely	4 Major	3 - High	-	
2.01	Wells 1, 2, 3, 4	Unsafe Water supply	E.coli, Crypto, Giardia	2 - Dauan	4 Likely	4 Major	3 - High	Wells are located on vacant land away from residential septic tanks Vermin proof lid to well locked gate and weir pump well. Operators to monitor area around well and wier for any signs of contamination. Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-01	
2.02	Wells 1, 2, 3, 4	Unsafe Water supply	High turbidity	2 - Dauan	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01	
2.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giardia	2 - Dauan	3 Possible	4 Major	3 - High	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02	
2.04	Lagoon	Bushfire	Contamination of storage supply	2 - Dauan	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
2.05	WTP	Ineffective Treatment	High Chlorine residual	2 - Dauan	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	

K.4 - Risk Assessment

2.06	WTP	Ineffective Treatment	Low Chlorine residual	2 - Dauan	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04
2.07	WTP	Ineffective Treatment	Turbidity	2 - Dauan	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05
2.08	WTP	Ineffective Treatment	E.coli	2 - Dauan	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06
2.09	WTP	Ineffective Treatment	Crypto, Giardia	2 - Dauan	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia Fire breaks around lagoon and WTP	3 Possible	4 Major	3 - High	WS-02, WS-07
2.10	System	Bushfire	Damage to Assets	2 - Dauan	3 Possible	3 Moderate	2 - Medium	Buried pipework	3 Possible	3 Moderate	2 - Medium	WS-03, WS-08
2.11	System	Water Security	Loss of critical supplies	2 - Dauan	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09
2.12	Reservoir	Reservoir Burst (Rock Slide)	Loss of critical supplies	2 - Dauan	2 Unlikely	4 Major	2 - Medium	-	2 Unlikely	4 Major	2 - Medium	WS-10
3.01	Lagoon Catchment	Unsafe Water supply	E.coli, Crypto, Giardia	3 - Saibai	4 Likely	4 Major	3 - High	Operators to monitor area around lagoon for any signs of contamination. Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-01
3.02	Emergency Lagoons (Mud)	Unsafe Water supply	High turbidity	3 - Saibai	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01
3.03	Emergency Lagoons (Mud)	Unsafe Water supply	E.coli, Crypto, Giardia	3 - Saibai	3 Possible	4 Major	3 - High	Lagoon catchment is fenced Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02
3.04	Lagoon	Bushfire	Contamination of storage supply	3 - Saibai	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03
3.05	WTP	Ineffective Treatment	High Chlorine residual	3 - Saibai	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04
3.06	WTP	Ineffective Treatment	Low Chlorine residual	3 - Saibai	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04
3.07	WTP	Ineffective Treatment	Turbidity	3 - Saibai	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05
3.08	WTP	Ineffective Treatment	E.coli	3 - Saibai	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06
3.10	System	Bushfire	Damage to Assets	3 - Saibai	3 Possible	3 Moderate	2 - Medium	Fire breaks around lagoon and WTP Buried pipework	3 Possible	3 Moderate	2 - Medium	WS-03, WS-08
3.11	System	Water Security	Loss of critical supplies	3 - Saibai	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09
4.01	Weir - Catchment	Unsafe Water supply	E.coli, Crypto, Giardia	4 - Mabuia	4 Likely	4 Major	3 - High	Chlorinated water supply (automated) Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-01
4.02	Catchment (Weir)	Unsafe Water supply	High turbidity	4 - Mabuia	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01
4.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giardia	4 - Mabuia	3 Possible	4 Major	3 - High	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02
4.04	Lagoon	Bushfire	Contamination of storage supply	4 - Mabuia	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03
4.05	WTP	Ineffective Treatment	High Chlorine residual	4 - Mabuia	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04
4.06	WTP	Ineffective Treatment	Low Chlorine residual	4 - Mabuia	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04

K.4 - Risk Assessment

4.07	WTP	Ineffective Treatment	Turbidity	4 - Mabuiaq	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
4.08	WTP	Ineffective Treatment	E.coli	4 - Mabuiaq	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
4.09	WTP	Ineffective Treatment	Crypto, Giardia	4 - Mabuiaq	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
4.10	System	Bushfire	Damage to Assets	4 - Mabuiaq	3 Possible	3 Moderate	2 - Medium	Fire breaks around lagoon and WTP Burried pipework	3 Possible	3 Moderate	2 - Medium	WS-03, WS-08	
4.11	System	Water Security	Loss of critical supplies	4 - Mabuiaq	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
5.01	Catchment	Loss of Critical Water Supply	High pH	5 - Badu	3 Possible	2 Minor	2 - Medium	Reservoir on island to provide interium short term water supply Weekday monitoring of pH for each well in the water catchment	2 Unlikely	2 Minor	1 - Low	WS-01	
5.02	Catchment	Loss of Critical Water Supply	Contamination of raw water supply	5 - Badu	3 Possible	4 Major	3 - High	UF Plant Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	1 Rare	4 Major	2 - Medium	WS-01	
5.03	Catchment	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	5 - Badu	5 Almost Certain	1 Insignificant	2 - Medium	UF Plant Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
5.04	WTP	Ineffective Treatment	High Chlorine residual	5 - Badu	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
5.05	WTP	Ineffective Treatment	Low Chlorine residual	5 - Badu	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
5.06	WTP	Ineffective Treatment	Turbidity	5 - Badu	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
5.07	WTP	Ineffective Treatment	E.coli	5 - Badu	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	3 Possible	4 Major	3 - High	WS-01, WS-06, WS-13	
5.08	WTP	Ineffective Treatment	Crypto, Giardia	5 - Badu	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07, WS-13	
5.09	System	Water Security	Loss of critical supplies	5 - Badu	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
5.10	System	Bushfire	Damage to Assets	5 - Badu	3 Possible	4 Major	3 - High	Fire breaks around wells and WTP Burried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
5.11	System	Loss of Critical Water Supply	Reservoir empty	5 - Badu	2 Unlikely	5 Catastrophic	3 - High	Nil	2 Unlikely	5 Catastrophic	3 - High	WS-09	
6.01	Twin Springs Well & Weir	Unsafe Water supply	E.coli, Crypto, Giadia	6 - Kubin	4 Likely	4 Major	3 - High	Operators to monitor area around well and wier for any signs of contamination. Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-01	
6.02	Twin Springs Well & Weir	Unsafe Water supply	High turbidity	6 - Kubin	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01	
6.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giadia	6 - Kubin	3 Possible	4 Major	3 - High	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02	
6.04	Lagoon	Bushfire	Contamination of storage supply	6 - Kubin	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
6.05	WTP	Ineffective Treatment	High Chlorine residual	6 - Kubin	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	

K.4 - Risk Assessment

6.06	WTP	Ineffective Treatment	Low Chlorine residual	6 - Kubin	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
6.07	WTP	Ineffective Treatment	Turbidity	6 - Kubin	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
6.08	WTP	Ineffective Treatment	E.coli	6 - Kubin	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
6.09	WTP	Ineffective Treatment	Crypto, Giardia	6 - Kubin	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia Fire breaks around lagoon and WTP	3 Possible	4 Major	3 - High	WS-02, WS-07	
6.10	System	Bushfire	Damage to Assets	6 - Kubin	3 Possible	3 Moderate	2 - Medium	Buried pipework	3 Possible	3 Moderate	2 - Medium	WS-03, WS-08	
6.11	System	Water Security	Loss of critical supplies	6 - Kubin	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
7.01	Weir, Well 1, Well 4	Unsafe Water supply	E.coli, Crypto, Giardia	7 - St Pauls	4 Likely	4 Major	3 - High	Vermin proof lid to well Locked gate and weir pump well. Operators to monitor area around well and wier for any signs of contamination. Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-01	
7.02	Catchment (Weir and Well 1 & 4)	Unsafe Water supply	High turbidity	7 - St Pauls	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01	
7.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giardia	7 - St Pauls	3 Possible	4 Major	3 - High	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02	
7.04	Lagoon	Bushfire	Contamination of storage supply	7 - St Pauls	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
7.05	WTP	Ineffective Treatment	High Chlorine residual	7 - St Pauls	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
7.06	WTP	Ineffective Treatment	Low Chlorine residual	7 - St Pauls	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
7.07	WTP	Ineffective Treatment	Turbidity	7 - St Pauls	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
7.08	WTP	Ineffective Treatment	E.coli	7 - St Pauls	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
7.09	WTP	Ineffective Treatment	Crypto, Giardia	7 - St Pauls	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia Fire breaks around lagoon and WTP	3 Possible	4 Major	3 - High	WS-02, WS-07	
7.10	System	Bushfire	Damage to Assets	7 - St Pauls	3 Possible	3 Moderate	2 - Medium	Buried pipework	3 Possible	3 Moderate	2 - Medium	WS-03, WS-08	
7.11	System	Water Security	Loss of critical supplies	7 - St Pauls	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
8.01	Catchment	Loss of Critical Water Supply	High colour	8 - Hammond	3 Possible	2 Minor	2 - Medium	Primary raw water supply from TI link Media filder and panel filter	2 Unlikely	2 Minor	1 - Low	WS-01	
8.02	Catchment	Loss of Critical Water Supply	Contamination of raw water supply	8 - Hammond	3 Possible	4 Major	3 - High	Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	1 Rare	4 Major	2 - Medium	WS-01	
8.03	Catchment	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	8 - Hammond	5 Almost Certain	1 Insignificant	2 - Medium	Media filder and panel filter Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	

K.4 - Risk Assessment

8.04	WTP	Ineffective Treatment	High Chlorine residual	8 - Hammond	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
8.05	WTP	Ineffective Treatment	Low Chlorine residual	8 - Hammond	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
8.06	WTP	Ineffective Treatment	Turbidity	8 - Hammond	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
8.07	WTP	Ineffective Treatment	E.coli	8 - Hammond	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
8.08	WTP	Ineffective Treatment	Crypto, Giardia	8 - Hammond	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
8.09	System	Water Security	Loss of critical supplies	8 - Hammond	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
8.10	System	Bushfire	Damage to Assets	8 - Hammond	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Buried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
8.11	System	Water Security	TI Link Risk	8 - Hammond	2 Unlikely	5 Catastrophic	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
9.01	Catchment (Saltwater intake line)	Loss of Critical Water Supply	High Turbidity	9 - lama	2 Unlikely	2 Minor	1 - Low	Reservoir on island to provide interium short term water supply	2 Unlikely	2 Minor	1 - Low	WS-01	
9.02	Catchment (Saltwater infiltration gallery)	Poor Water Quality	Petroleum/chemical contamination of seawater	9 - lama	4 Likely	4 Major	3 - High	Seawater intake infiltration gallery is located under the beach Visual inspections of area only Notification of incident from barge operator and shut down plant upon notification	1 Rare	4 Major	2 - Medium	WS-01	
9.03	Catchment (Saltwater infiltration galery)	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	9 - lama	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
9.04	WTP	Ineffective Treatment	High Chlorine residual	9 - lama	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
9.05	WTP	Ineffective Treatment	Low Chlorine residual	9 - lama	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
9.06	WTP	Ineffective Treatment	Turbidity	9 - lama	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
9.07	WTP	Ineffective Treatment	E.coli	9 - lama	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
9.08	WTP	Ineffective Treatment	Crypto, Giardia	9 - lama	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
9.09	WTP - RO Unit	Ineffective Treatment	High Dissolved Solids	9 - lama	5 Almost Certain	2 Minor	2 - Medium	Week day conductivity monitoring for each RO Unit, raw water and treated water RO Unit flushing and membrane changes completed as required	5 Almost Certain	2 Minor	2 - Medium	-	
9.10	System	Water Security	Loss of critical supplies	9 - lama	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
9.11	System	Bushfire	Damage to Assets	9 - lama	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Buried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
9.12	System	Loss of Critical Water Supply	Reservoir empty	9 - lama	3 Possible	5 Catastrophic	3 - High	Multiple permanant desalination units installed on island	3 Possible	5 Catastrophic	3 - High	WS-09	
10.01	Catchment (Saltwater intake line)	Loss of Critical Water Supply	High Turbidity	10 - Warraber	2 Unlikely	2 Minor	1 - Low	Lagoon on island to provide interium short term water supply	1 Rare	2 Minor	1 - Low	-	
10.02	Catchment (Saltwater intake line)	Poor Water Quality	Petroleum/chemical contamination of seawater	10 - Warraber	4 Likely	4 Major	3 - High	Water supply to desalination unit is provided by high salinity bore water	1 Rare	4 Major	2 - Medium	-	

K.4 - Risk Assessment

10.03	Catchment (Saltwater bore)	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	10 - Warraber	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
10.04	WTP	Ineffective Treatment	High Chlorine residual	10 - Warraber	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
10.05	WTP	Ineffective Treatment	Low Chlorine residual	10 - Warraber	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
10.06	WTP	Ineffective Treatment	Turbidity	10 - Warraber	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
10.07	WTP	Ineffective Treatment	E.coli	10 - Warraber	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
10.08	WTP	Ineffective Treatment	Crypto, Giardia	10 - Warraber	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
10.09	WTP - RO Unit	Ineffective Treatment	High Dissolved Solids	10 - Warraber	5 Almost Certain	2 Minor	2 - Medium	Week day conductivity monitoring for each RO Unit, raw water and treated water RO Unit flushing and membrane changes completed as required	5 Almost Certain	2 Minor	2 - Medium	WS-01, WS-16	
10.10	System	Water Security	Loss of critical supplies	10 - Warraber	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
10.11	System	Bushfire	Damage to Assets	10 - Warraber	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Buried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
10.12	Lagoon	Bushfire	Damage to assets	10 - Warraber	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
10.13	Lagoon	Pathogen and Microbial Contaminant	Contamination of storage supply	10 - Warraber	5 Almost Certain	3 Moderate	3 - High	Lagoon Catchment fenced and inspections carried out weekly. Cleaning of covers pre wet season and post wetseason, as needed during year First flush water is bypassed off lagoon covers Monthly E.coli testing	5 Almost Certain	2 Minor	2 - Medium	-	
10.14	Sea Wall	Salt Water Inundation	Contamination of storage supply	10 - Warraber	3 Possible	4 Major	3 - High	Nil	3 Possible	4 Major	3 - High	-	
11.01	Catchment (Saltwater intake line)	Loss of Critical Water Supply	High Turbidity	11 - Poruma	2 Unlikely	2 Minor	1 - Low	Lagoon on island to provide interium short term water supply	1 Rare	2 Minor	1 - Low	-	
11.02	Catchment (Saltwater intake line)	Poor Water Quality	Petroleum/chemical contamination of seawater	11 - Poruma	4 Likely	4 Major	3 - High	Water supply to desalination unit is provided by high salinity bore water	1 Rare	4 Major	2 - Medium	-	
11.03	Catchment (Saltwater bore)	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	11 - Poruma	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
11.04	WTP	Ineffective Treatment	High Chlorine residual	11 - Poruma	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
11.05	WTP	Ineffective Treatment	Low Chlorine residual	11 - Poruma	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
11.06	WTP	Ineffective Treatment	Turbidity	11 - Poruma	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
11.07	WTP	Ineffective Treatment	E.coli	11 - Poruma	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
11.08	WTP	Ineffective Treatment	Crypto, Giardia	11 - Poruma	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
11.09	WTP - RO Unit	Ineffective Treatment	High Dissolved Solids	11 - Poruma	5 Almost Certain	2 Minor	2 - Medium	Week day conductivity monitoring for each RO Unit, raw water and treated water RO Unit flushing and membrane changes completed as required	5 Almost Certain	2 Minor	2 - Medium	-	

K.4 - Risk Assessment

11.10	System	Water Security	Loss of critical supplies	11 - Poruma	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
11.11	System	Bushfire	Damage to Assets	11 - Poruma	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Burried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
11.12	Lagoon	Bushfire	Damage to assets	11 - Poruma	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
11.13	Lagoon	Pathogen and Microbial Contaminant	Contamination of storage supply	11 - Poruma	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon Catchment fenced and inspections carried out weekly. Cleaning of covers pre wet season and post wetseason as needed during year First flush water is bypassed off lagoon covers Monthly E.coli testing	5 Almost Certain	1 Insignificant	2 - Medium	-	
11.14	Sea Wall	Salt Water Innundation	Contamination of storage supply	11 - Poruma	3 Possible	4 Major	3 - High	Nil	3 Possible	4 Major	3 - High	-	
12.01	Catchment (Saltwater intake line)	Loss of Critical Water Supply	High Turbidity	12 - Masig	2 Unlikely	2 Minor	1 - Low	Lagoon on island to provide interium short term water supply	1 Rare	2 Minor	1 - Low	-	
12.02	Catchment (Saltwater intake line)	Poor Water Quality	Petroleum/chemical contamination of seawater	12 - Masig	4 Likely	4 Major	3 - High	Water supply to desalination unit is provided by high salinity bore water	1 Rare	4 Major	2 - Medium	-	
12.03	Catchment (Saltwater bore)	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	12 - Masig	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
12.04	WTP	Ineffective Treatment	High Chlorine residual	12 - Masig	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
12.05	WTP	Ineffective Treatment	Low Chlorine residual	12 - Masig	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
12.06	WTP	Ineffective Treatment	Turbidity	12 - Masig	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
12.07	WTP	Ineffective Treatment	E.coli	12 - Masig	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
12.08	WTP	Ineffective Treatment	Crypto, Giardia	12 - Masig	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
12.09	WTP - RO Unit	Ineffective Treatment	High Dissolved Solids	12 - Masig	5 Almost Certain	2 Minor	2 - Medium	Week day conductivity monitoring for each RO Unit, raw water and treated water RO Unit flushing and membrane changes completed as required	5 Almost Certain	2 Minor	2 - Medium	-	
12.10	System	Water Security	Loss of critical supplies	12 - Masig	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
12.11	System	Bushfire	Damage to Assets	12 - Masig	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Burried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
12.12	Lagoon	Bushfire	Damage to assets	12 - Masig	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
12.13	Lagoon	Pathogen and Microbial Contaminant	Contamination of storage supply	12 - Masig	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon Catchment fenced and inspections carried out weekly. Cleaning of covers pre wet season and post wetseason, as needed during year First flush water is bypassed off lagoon covers Monthly E.coli testing	5 Almost Certain	1 Insignificant	2 - Medium	-	
12.14	Sea Wall	Salt Water Innundation	Contamination of storage supply	12 - Masig	3 Possible	4 Major	3 - High	Nil	3 Possible	4 Major	3 - High	-	
13.01	Catchment (Saltwater intake line)	Loss of Critical Water Supply	High Turbidity	13 - Ugar	2 Unlikely	2 Minor	1 - Low	Lagoon on island to provide interium short term water supply	1 Rare	2 Minor	1 - Low	-	
13.02	Catchment (Saltwater intake line)	Poor Water Quality	Petroleum/chemical contamination of seawater	13 - Ugar	2 Unlikely	4 Major	2 - Medium	Seawater intake line is located out under jetty, approx 50m from shore. Visual inspections of area only. Notification of incident from barge operator and shut down plant upon notification	1 Rare	4 Major	2 - Medium	-	

K.4 - Risk Assessment

13.03	Catchment (Saltwater intake line)	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	13 - Ugar	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
13.04	WTP	Ineffective Treatment	High Chlorine residual	13 - Ugar	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
13.05	WTP	Ineffective Treatment	Low Chlorine residual	13 - Ugar	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
13.06	WTP	Ineffective Treatment	Turbidity	13 - Ugar	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
13.07	WTP	Ineffective Treatment	E.coli	13 - Ugar	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
13.08	WTP	Ineffective Treatment	Crypto, Giardia	13 - Ugar	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
13.09	WTP - RO Unit	Ineffective Treatment	High Dissolved Solids	13 - Ugar	5 Almost Certain	2 Minor	2 - Medium	Week day conductivity monitoring for each RO Unit, raw water and treated water RO Unit flushing and membrane changes completed as required	5 Almost Certain	2 Minor	2 - Medium	-	
13.10	System	Water Security	Loss of critical supplies	13 - Ugar	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
13.11	System	Bushfire	Damage to Assets	13 - Ugar	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Buried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
13.12	Lagoon	Bushfire	Damage to assets	13 - Ugar	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
13.13	Lagoon	Pathogen and Microbial Contaminant	Contamination of storage supply	13 - Ugar	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon Catchment fenced and inspections carried out weekly. Cleaning of covers pre wet season and post wetseason, as needed during year First flush water is bypassed off lagoon covers Monthly E.coli testing	5 Almost Certain	1 Insignificant	2 - Medium	WS-01	
13.14	Sea Wall	Salt Water Inundation	Contamination of storage supply	13 - Ugar	3 Possible	4 Major	3 - High	Boigu sea wall	2 Unlikely	4 Major	2 - Medium	-	
13.15	Jetty	Jetty Collapse	Loss of critical supplies	13 - Ugar	4 Likely	4 Major	3 - High	Nil	4 Likely	4 Major	3 - High	-	
14.01	Catchment	Loss of Critical Water Supply	Water Parameter Exceedence	14 - Erub	3 Possible	2 Minor	2 - Medium	Lagoon on island to provide interium short term water supply	2 Unlikely	2 Minor	1 - Low	WS-01	
14.02	Catchment	Loss of Critical Water Supply	Contamination of raw water supply	14 - Erub	3 Possible	4 Major	3 - High	UF Plant Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	1 Rare	4 Major	2 - Medium	-	
14.03	Catchment	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia	14 - Erub	5 Almost Certain	1 Insignificant	2 - Medium	UF Plant Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
14.04	WTP	Ineffective Treatment	High Chlorine residual	14 - Erub	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
14.05	WTP	Ineffective Treatment	Low Chlorine residual	14 - Erub	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
14.06	WTP	Ineffective Treatment	Turbidity	14 - Erub	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
14.07	WTP	Ineffective Treatment	E.coli	14 - Erub	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	3 Possible	4 Major	3 - High	WS-01, WS-06, WS-13	
14.08	WTP	Ineffective Treatment	Crypto, Giardia	14 - Erub	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07, WS-13	
14.09	System	Water Security	Loss of critical supplies	14 - Erub	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	

K.4 - Risk Assessment

14.10	System	Bushfire	Damage to Assets	14 - Erub	3 Possible	4 Major	3 - High	Fire breaks around wells and WTP Burried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
14.11	System	Loss of Critical Water Supply	Reservoir empty	14 - Erub	2 Unlikely	5 Catastrophic	3 - High	Nil	2 Unlikely	5 Catastrophic	3 - High	WS-09	
14.12	Lagoon	Bushfire	Damage to assets	14 - Erub	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
14.13	Lagoon	Pathogen and Microbial Contaminant	Contamination of storage supply	14 - Erub	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon Catchment fenced and inspections carried out weekly. Cleaning of covers pre wet season and post wetseason, as needed during year First flush water is bypassed off lagoon covers Monthly E.coli testing	5 Almost Certain	1 Insignificant	2 - Medium	-	
14.14	Reservoir	WTP Critical Failure	Failure of Reservoir	14 - Erub	5 Almost Certain	3 Moderate	3 - High	Nil	5 Almost Certain	3 Moderate	3 - High	WS-14	
15.01	Catchment (Saltwater intake line)	Loss of Critical Water Supply	High Turbidity	15 - Mer	2 Unlikely	2 Minor	1 - Low	Lagoon on island to provide interium short term water supply	1 Rare	2 Minor	1 - Low	-	
15.02	Catchment (Saltwater intake line)	Poor Water Quality	Petroleum/chemical contamination of seawater	15 - Mer	2 Unlikely	4 Major	2 - Medium	Raw water	1 Rare	4 Major	2 - Medium	-	
15.03	Catchment (Saltwater infiltration galery)	Pathogen and Microbial Contaminant	E.coli, Crypto, Giardia		5 Almost Certain	1 Insignificant	2 - Medium	Lagoon catchment is fenced Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	3 Possible	1 Insignificant	1 - Low	WS-02	
15.04	WTP	Ineffective Treatment	High Chlorine residual	15 - Mer	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
15.05	WTP	Ineffective Treatment	Low Chlorine residual	15 - Mer	3 Possible	3 Moderate	2 - Medium	Automated duty / standby chlorine dosing and monitoring system linked to SCADA Week day chlorine monitoring in the network at 5 set locations	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-04	
15.06	WTP	Ineffective Treatment	Turbidity	15 - Mer	3 Possible	3 Moderate	2 - Medium	Week day turbidity monitoring in the network at 5 set locations Backwashing completed on regular basis	2 Unlikely	3 Moderate	2 - Medium	WS-01, WS-02, WS-04, WS-05	
15.07	WTP	Ineffective Treatment	E.coli	15 - Mer	3 Possible	4 Major	3 - High	Monthly E.coli testing of drinking water supply Chlorinated water supply (automated)	2 Unlikely	4 Major	2 - Medium	WS-01, WS-06	
15.08	WTP	Ineffective Treatment	Crypto, Giardia	15 - Mer	3 Possible	4 Major	3 - High	6 monthly testing for crypto and giardia	3 Possible	4 Major	3 - High	WS-02, WS-07	
15.09	WTP - RO Unit	Ineffective Treatment	High Dissolved Solids	15 - Mer	5 Almost Certain	2 Minor	2 - Medium	Week day conductivity monitoring for each RO Unit, raw water and treated water RO Unit flushing and membrane changes completed as required	5 Almost Certain	2 Minor	2 - Medium	-	
15.09							#N/A				#N/A	-	
15.10	System	Water Security	Loss of critical supplies	15 - Mer	4 Likely	4 Major	3 - High	Mobile desalination unit available for times of heightened water security risks	2 Unlikely	4 Major	2 - Medium	WS-09	
15.11	System	Bushfire	Damage to Assets	15 - Mer	3 Possible	4 Major	3 - High	Fire breaks around lagoon and WTP Burried pipework	3 Possible	4 Major	3 - High	WS-03, WS-08	
15.12	Lagoon	Bushfire	Damage to assets	15 - Mer	3 Possible	3 Moderate	2 - Medium	Maintaining firebreaks around lagoons	2 Unlikely	3 Moderate	2 - Medium	WS-03	
15.13	Lagoon	Pathogen and Microbial Contaminant	Contamination of storage supply	15 - Mer	5 Almost Certain	1 Insignificant	2 - Medium	Lagoon Catchment fenced and inspections carried out weekly. Cleaning of covers pre wet season and post wetseason as needed during year First flush water is bypassed off lagoon covers Monthly E.coli testing	5 Almost Certain	1 Insignificant	2 - Medium	-	

K.5 - Key Word Prompts

Hazardous Event	Potential Hazards							
Human Resources	Staff Shortage	Staff Training	Cultural Events					
SCADA	Maintenance	Communications Failure						
Cyber Security Attack	Data Loss	Damage to Assets	Loss of Control	Loss of Monitoring Ability	Detection			
Lagoon	Bushfire	Algae Bloom	E.coli	ph	Turbidity	Colour	Conductivity	Dissolved Solids
Desalination Unit	Maintenance	Bushfire	Electricity Shortage	ph	Turbidity	Colour	Conductivity	Petroleum/chemical contamination of seawater
Raw Water	E.coli	ph	Turbidity	Colour	Conductivity			Pathogen and Microbial Contaminant
Treated Water	E.coli	ph	Turbidity	Colour	Conductivity	Chlorine Low	Chlorine High	Pathogen and Microbial Contaminant
Mains Break	E.coli	ph	Turbidity	Colour	Conductivity	Chlorine Low	Chlorine High	Pathogen and Microbial Contaminant
Ineffective Treatment	E.coli	ph	Turbidity	Colour	Conductivity	Chlorine Low	Chlorine High	Pathogen and Microbial Contaminant
Unsafe Water supply	E.coli	ph	Turbidity	Colour	Conductivity	Chlorine Low	Chlorine High	Pathogen and Microbial Contaminant
Water Security	Reservoir	Lagoon	Desaliantion	Contamination	Low Production	Burst Reservoir	Loss of critical supplies	
Network	Main Burst	Loss of water						

K.6 RMIP

RMIP Items

ID	Description	Impact
WS-01	Automated water parameter logging and/or 7-day testing of water parameters by water officer	98
WS-02	Install ultra filtration or UV for water scheme	54
WS-03	Provide hardstand or automated fire suppression system	29
WS-04	Install escalated alarming system	43
WS-05	Install automated backwash system	15
WS-06	Provide E.coli testing station on island	29
WS-07	Increase testing frequency for crypto and giardia	14
WS-08	Ensure all pipework is burried or SS316	15
WS-09	Provide permanant desalination unit on island	35
WS-10	Ensure spare booster pump set is available on island for emergency installation	1
WS-11	GeoSCADA (Individual logins regulated by active directory)	3
WS-12	DNP3 (Secures radio transmissions)	1
WS-13	Upgrade supply and return line to Badu reservoir (remove push / pull water system)	4
WS-14	Upgrade reservoir to increase useable lifespan	1
WS-15	Develop procedurised stocklist and ordering methodology	1
WS-16	Develop procedurised preventative maintenance plan	1

Extreme Risks

ID #	Location	Hazardous Event	Hazard	Scheme	Preventative Measures	RMIP
0.08 System		Abuse/corruption/ransomware/malware of cyber information	Data loss Lack of ability to supply drinking water	All	Virusprotection Firewall	-
0.13 System		Climate Change	Existential threat to operations	All	Nil	-

High Risks

ID #	Location	Hazardous Event	Hazard	Scheme	Preventative Measures	RMIP
0.04 System		Lack of skilled employees	Damage to plant Poor operation Incidents	All	DWQMP Appendix I - Training Managment Plan SCADA monitoring and automated chlorine dosing Automation of plants to ensure continious operation without operator input	-
0.07 System		Interference/disruption of SCADA - unauthorised access	Lack of maintenance Loss of monitoring ability and alarming Data loss Poor plant performance Incidents	All	Daily monitoring of SCADA system Physical presence at WTP and STP on week days Firewall / Penetration Testing Teamviewer Physical presence at WTP and STP on weekdays	WS-12
0.09 System		Lack of physical security over online assets	Damage to or loss of online assets	All	Minor physical security barriers such as fences to key assets Reporting of suspected incidents	-
0.10 System		Lack of access control and identity management	Loss of monitoring ability and alarming. Data loss Loss of monitoring ability and alarming	All	-	WS-11
0.12 System		Lack of ability to detect if a cyber security event has occurred	Data loss Poor plant performance Incidents	All	Virusprotection, firewall, IT team managed	-
0.15 System		False Positive	E.coli	All	Multiple island based E.coli test stations	WS-06
1.08 WTP		Ineffective Treatment	Crypto, Giardia	1 - Boigu	6 monthly testing for crypto and giardia	WS-02, WS-07

K.6 RMIP

1.11	System	Bushfire	Damage to Assets	1 - Boigu	Fire breaks around lagoon and WTP	WS-03, WS-08
1.15	Jetty	Jetty Collapse	Loss of critical supplies	1 - Boigu	Burried pipework Nil	-
2.01	Wells 1, 2, 3, 4	Unsafe Water supply	E.coli, Crypto, Giadia	2 - Dauan	Wells are located on vacant land away from residential septic tanks Vermin proof lid to well locked gate and weir pump well. Operators to monitor area around well and wier for any signs of contamination. Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia Lagoon catchment is fenced	WS-01
2.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giadia	2 - Dauan	Cleaning of covers pre wet season and post wetseason (and as needed during year) Lagoon is located on western coast, away from STP and residential infrastructure Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	WS-02
2.09	WTP	Ineffective Treatment	Crypto, Giardia	2 - Dauan	Lagoon catchment is fenced Operators to monitor area around lagoon for any signs of contamination. Chlorinated water supply (automated)	WS-02, WS-07
3.01	Lagoon Catchment	Unsafe Water supply	E.coli, Crypto, Giadia	3 - Saibai	Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia Lagoon catchment is fenced	WS-01
3.03	Emergency Lagoons (Mud)	Unsafe Water supply	E.coli, Crypto, Giadia	3 - Saibai	Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	WS-02
4.01	Weir - Catchment	Unsafe Water supply	E.coli, Crypto, Giadia	4 - Mabuia	Chlorinated water supply (automated) Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia Lagoon catchment is fenced	WS-01
4.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giadia	4 - Mabuia	Cleaning of covers pre wet season and post wetseason (and as needed during year) Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia	WS-02
4.09	WTP	Ineffective Treatment	Crypto, Giardia	4 - Mabuia	6 monthly testing for crypto and giardia Monthly E.coli testing of drinking water supply	WS-02, WS-07
5.07	WTP	Ineffective Treatment	E.coli	5 - Badu	Chlorinated water supply (automated)	WS-01, WS-06, WS-13
5.08	WTP	Ineffective Treatment	Crypto, Giardia	5 - Badu	6 monthly testing for crypto and giardia	WS-02, WS-07, WS-13
5.10	System	Bushfire	Damage to Assets	5 - Badu	Fire breaks around wells and WTP Burried pipework	WS-03, WS-08
5.11	System	Loss of Critical Water Supply	Reservoir empty	5 - Badu	Nil	WS-09

K.6 RMIP

6.01	Twin Springs Well & Weir	Unsafe Water supply	E.coli, Crypto, Giadia	6 - Kubin	Operators to monitor area around well and wier for any signs of contamination. Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia Lagoon catchment is fenced	WS-01
6.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giadia	6 - Kubin	Cleaning of covers pre wet season and post wetseason (and as needed during year) Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply	WS-02
6.09	WTP	Ineffective Treatment	Crypto, Giardia	6 - Kubin	6 monthly testing for crypto and giardia Vermin proof lid to well	WS-02, WS-07
7.01	Weir, Well 1, Well 4	Unsafe Water supply	E.coli, Crypto, Giadia	7 - St Pauls	Locked gate and weir pump well. Operators to monitor area around well and wier for any signs of contamination. Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply 6 monthly testing for crypto and giardia Lagoon catchment is fenced	WS-01
7.03	Lagoon	Unsafe Water supply	E.coli, Crypto, Giadia	7 - St Pauls	Cleaning of covers pre wet season and post wetseason (and as needed during year) Chlorinated water supply (automated) Week day chlorine monitoring in the network at 5 set locations Monthly E.coli testing of drinking water supply	WS-02
7.09	WTP	Ineffective Treatment	Crypto, Giardia	7 - St Pauls	6 monthly testing for crypto and giardia	WS-02, WS-07
8.08	WTP	Ineffective Treatment	Crypto, Giardia	8 - Hammond	6 monthly testing for crypto and giardia	WS-02, WS-07
8.10	System	Bushfire	Damage to Assets	8 - Hammond	Fire breaks around lagoon and WTP Burried pipework	WS-03, WS-08
9.08	WTP	Ineffective Treatment	Crypto, Giardia	9 - lama	6 monthly testing for crypto and giardia Fire breaks around lagoon and WTP	WS-02, WS-07
9.11	System	Bushfire	Damage to Assets	9 - lama	Burried pipework	WS-03, WS-08
9.12	System	Loss of Critical Water Supply	Reservoir empty	9 - lama	Multiple permenant desalination units installed on island	WS-09
10.08	WTP	Ineffective Treatment	Crypto, Giardia	10 - Warraber	6 monthly testing for crypto and giardia Fire breaks around lagoon and WTP	WS-02, WS-07
10.11	System	Bushfire	Damage to Assets	10 - Warraber	Burried pipework	WS-03, WS-08
10.14	Sea Wall	Salt Water Innundation	Contamination of storage supply	10 - Warraber	Nil	-
11.08	WTP	Ineffective Treatment	Crypto, Giardia	11 - Poruma	6 monthly testing for crypto and giardia Fire breaks around lagoon and WTP	WS-02, WS-07
11.11	System	Bushfire	Damage to Assets	11 - Poruma	Burried pipework	WS-03, WS-08
11.14	Sea Wall	Salt Water Innundation	Contamination of storage supply	11 - Poruma	Nil	-
12.08	WTP	Ineffective Treatment	Crypto, Giardia	12 - Masig	6 monthly testing for crypto and giardia Fire breaks around lagoon and WTP	WS-02, WS-07
12.11	System	Bushfire	Damage to Assets	12 - Masig	Burried pipework	WS-03, WS-08
12.14	Sea Wall	Salt Water Innundation	Contamination of storage supply	12 - Masig	Nil	-
13.08	WTP	Ineffective Treatment	Crypto, Giardia	13 - Ugar	6 monthly testing for crypto and giardia	WS-02, WS-07

K.6 RMIP

13.11	System	Bushfire	Damage to Assets	13 - Ugar	Fire breaks around lagoon and WTP	WS-03, WS-08
13.15	Jetty	Jetty Collapse	Loss of critical supplies	13 - Ugar	Burried pipework Nil	-
14.07	WTP	Ineffective Treatment	E.coli	14 - Erub	Monthly E.coli testing of drinking water supply	WS-01, WS-06, WS-13
14.08	WTP	Ineffective Treatment	Crypto, Giardia	14 - Erub	Chlorinated water supply (automated) 6 monthly testing for crypto and giardia	WS-02, WS-07, WS-13
14.10	System	Bushfire	Damage to Assets	14 - Erub	Fire breaks around wells and WTP	WS-03, WS-08
14.11	System	Loss of Critical Water Supply	Reservoir empty	14 - Erub	Burried pipework Nil	WS-09
14.14	Reservoir	WTP Critical Failure	Failure of Reservoir	14 - Erub	Nil	WS-14
15.08	WTP	Ineffective Treatment	Crypto, Giardia	15 - Mer	6 monthly testing for crypto and giardia	WS-02, WS-07
15.11	System	Bushfire	Damage to Assets	15 - Mer	Fire breaks around lagoon and WTP Burried pipework	WS-03, WS-08