# Drinking Water Quality Management DWQMP – Annual Report

2022-2023

Whitsunday Regional Council

Service Provider No.: 501

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Date: 15 December 2023

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# Glossary of Terms

| | |
|---|---|
| ADWG 2011 | Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia |
| *E. coli* | *Escherichia coli*, a bacterium which is considered to indicate the presence of faecal contamination and therefore potential health risk |
| HACCP | Hazard Analysis and Critical Control Points certification for protecting drinking water quality |
| mg/L | Milligrams per litre |
| NTU | Nephelometric Turbidity Units |
| MPN/100mL | Most probable number per 100 millilitres |
| CFU/100mL | Colony forming units per 100 millilitres |
| < | Less than |
| > | Greater than |

| Date | Report | Author | Reviewed By | Authorised by COO |
|---|---|---|---|---|
| 15/12/2023 | Annual Report | Kerrie Pearson | Paul Sandbek | Troy Pettiford |

# Introduction

This report documents the performance of Whitsunday Regional Council's drinking water service with respect to water quality and performance in implementing the actions detailed in the DWQMP as required under the *Water Supply (Safety and Reliability) Act 2008* (the Act).

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality.

Whitsunday Regional Council is operating under an approved DWQMP to ensure consistent supply of safe quality drinking water in order to protect public health. This is done through proactive identification and minimisation of public health related risks associated with drinking water.

It has been prepared in accordance with the *Guideline for the preparation, review and audit of Drinking Water Quality Management Plans, Version 3* published by the Department of Regional Development, Manufacturing and Water, Queensland, October 2022 accessible at www.business.qld.gov.au.

# 1. Overview of Operations

Water and wastewater is managed within Whitsunday Regional Council by a separate business unit “Whitsunday Water” since July 2015.

Whitsunday Water maintains and operates 4 water treatment plants, supplying water to a seasonally fluctuating population of over 35 000 people, including residential, commercial, tourism and industrial customers.

| Scheme | Communities Served | Population served | Source | Treatment | Treatment Capacity, ML/day |
|---|---|---|---|---|---|
| Bowen | Bowen, Brisk Bay, Merinda | 10400<br><br>(5200 connections) | Sub-surface / open water intake in the Proserpine River | Conventional Flocculation with lamella plate settling and Dual media filtration. Disinfected with Sodium Hypochlorite. | 16.5<br>(Av 7.0) |
| Collinsville | Collinsville, Scottsville | 1700<br><br>(1200 connections) | Bowen River Weir, from Eungella Dam (Sunwater) | Conventional Flocculation and filtration. Disinfected with Sodium Hypochlorite. | 6<br>{Av 2.2) |
| Proserpine | Proserpine, Mt Julian (supplies Cannonvale/Airlie Beach) | 4200<br><br>(2000 connections) | Aquifer bores, supplemented from Peter Faust Dam | Conventional Flocculation with Dual media filtration. Disinfected with Sodium Hypochlorite. | 14<br>(Av 5.2) |
| Coastal | Cannonvale, Airlie Beach, Mt Julian, Jubilee Pocket | 14600<br><br>(6500 connections) | Aquifer bores | Conventional Flocculation with Dual media filtration. Disinfected with Sodium Hypochlorite. | 9.6<br>(Av 3.8) |

*Table 1- Drinking Water Supplies*

Major changes in recent years include:

- Bulk supply pipeline – replaced existing 225 bulk water supply pipeline from Proserpine WTP to Coastal WTP with a 559 diameter pipe; new pump station to pump through the new pipeline; redirect Bore 10 from Coastal to Proserpine WTP. Completed.
- Cannon Valley Reservoirs – Constructed 2 new 12ML reservoirs; redirecting water from the new bulk supply pipeline to the new reservoirs only, with the rest of the network then being gravity fed from the Cannon Valley Reservoirs. The reservoirs construction has been completed but they are not yet online.
- Replacement of the existing 5 low lift pumps at the Bowen Water treatment Plant. Underway.
- New Proserpine River open water intake pump/structure for Bowen Water treatment Plant including replacement of the existing High lift pump station building switchboard to incorporate new pumps and open water tank. Design underway.
- Construction of additional raw water production bores to improve water reliability, water security, and to accommodate growth of the Coastal and Proserpine water catchments. Investigation and testing underway.
- Replacement of the existing pumps at the coastal water treatment plant to enable pumping to the new Cannon Valley reservoirs. Underway.
- Cannonvale water network augmentation project – to construct various trunk water mains and interconnecting links to optimise the utilisation of the existing reservoirs and partition the network. Underway.

- Cannonvale reservoir reconfiguration to allow refurbishment, repair and reconfigure its inlet and outlet. This can only take place after the new Cannon Valley reservoirs are on-line.

These will be included in future amendments of the DWQMP.

# 2. DWQMP Implementation

Water quality has been ensured by the implementation of safeguards and barriers identified in the DWQMP. Water quality in all areas has been kept to high standards with the implementation of sampling regimes, maintenance schedules and hazard identifications highlighted in the DWQMP.

## 2.1 Implementing the Risk Management Improvement Program

Refer to Appendix B for a summary of progress in implementing each of the Improvement Program actions.

All risk management improvement programs outlined in the DWQMP are being or have been implemented or are part of an ongoing maintenance strategy.

Items in the Risk Management Improvement Plan (RMIP) that have been Updated include

- Bowen open water intake – 2023 - Civil works now at concept stage. Preliminary works commenced, works progressing. Low lift pumps in place and operational.
- Proserpine Turbidity Analysers install and commissioning completed – standardisation across WIM alliance region.
- Collinsville water treatment plant - Secondary control completed on each filter to enable plant shutdown
- Storage reservoir works
    - Collinsville, Miller St – completed.
    - Collinsville, Mt Devlin - RPEQ certified inspection identified additional works to meet regulations & specs. Works tendered to replace roof, vermin proofing and repairs up to required specs. Completion by June 2024
    - Bowen, 12ML - Reroofing, stairs and roof access. Completion by June 2025
    - Bowen, 3ML - Roof replacement, roof & stair access & leak detection and repair. Completion by June 2025
    - Cannonvale - Structural inspection and subsequent repair, dependent on when Cannon Valley reservoirs are on-line. Completion by June 2026
    - Shute Harbour (Mt Roper) - access fencing. Completion by June 2025
- Proserpine Bores – Bore investigation underway – drilling for testing bores midway through completion.
- Collinsville Solar Project – Nearing completion. Solar Array installed, awaiting connection expected early 2024.
- Site security – Working with Facilities on CCTV and Slide gates/boom gates
- Cybersecurity - ongoing

## 2.2 The Monitoring Program

Operational monitoring and Verification monitoring programs have continued unchanged throughout the year.

## 2.3 Amendments made to the DWQMP

Version 3 of the DWQMP was approved in December 2021.

A further amendment (Version 3.1) was made in April 2022, which was rejected in November 2022 after a Show Cause Notice in September 2022.

A review of the DWQMP (new version 3.1) was conducted and submitted with an amendment application in October 2023. Outcome is pending.

The Approved DWQMP as at 30 June 2023 is Version 3, approved in December 2021.

# 3. Compliance with Water Quality Criteria

The water quality criteria mean health guideline values in the most current Australian Drinking Water Guidelines, as well as the standards in the Public Health Regulation 2005.

A summary of water quality characteristics for each scheme is contained in Appendix A.

## 3.1 Chemical

All samples taken during this financial year met the recommended health values in the Australian Drinking Water Guidelines.

There were 2 in-house Manganese values at Bowen that were above the aesthetic value of 0.1 mg/L. These were both the reticulated and treated sample from the same day, 24 August 2022. The in-house results did not correlate with the external results for August at below detection (<0.001 mg/L).

An in-house Aluminium value at Proserpine was above the aesthetic limit at 0.26 mg/L on 30 June 2023. The external samples from June 2023, with results of 0.091 and 0.14 mg/L for the reticulated and treated samples respectively, did not correlate with the in-house result.

Chlorate was detected again in Bowen Treated and Reticulated water in January and February 2023, respectively.

## 3.2 E. coli

There were no detections of E.coli for the 2022-23 financial year.

## 3.3 Fluoride

Fluoride is not added to water within the Whitsunday Regional Council area, so levels detected are natural background levels.

# 4. Notifications to the Regulator

The only notification made this year was involving a dirty water event at Collinsville over the weekend of 26 and 27 November 2022. Storm (electrical) events had disabled the Raw Water high Turbidity alarm. This allowed dirty water through the process into the Clear Water Storage (CWS) and may have been released to the reservoir. Reservoirs and the reticulation system were checked over the next few days with no indication that the dirty water had passed through to the reticulation system. All Turbidity results were below 2 NTU, all bacteriological results were <1 cfu/100mL. Until further actions can be completed the plant will not be run unmanned during the wet season. Other further actions include Dynamic dosing of raw water linked to turbidity, discussion with Sunwater about possibility of a turbidity meter at the Turkey nest and project plan for some installation works that have been delayed previously. The incident was closed in April 2023.

Refer to Incident DWI-501-22-09970.

# 5. Customer Complaints Related to Water Quality

Whitsunday Regional Council is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Throughout the year the following complaints about water quality were received:

| | Suspected Illness | Dirty water | Taste and odour | Total |
|---|---|---|---|---|
| Bowen | 0 | 7 | 1 | 8 |
| Coastal | 0 | 1 | 3 | 4 |
| Collinsville | 0 | 0 | 0 | 0 |
| Proserpine | 0 | 1 | 0 | 1 |
| Total | 0 | 9 | 4 | 13 |

*Table 2 – Complaints about water quality*

## 5.1 Suspected Illness

There were no suspected illness complaints attributed to potable water.

## 5.2 Discoloured Water

The dirty water complaints in the Bowen area during the 2022-23 year were not related in either location, timing or source characteristics. For each instance the line was flushed to achieve clear water and no further action was required.

The dirty water complaints in the Coastal and Proserpine areas were, in each case, a localised issue and was flushed to achieve clear water. No further action was required.

## 5.3 Taste and Odour

The taste and odour complaints in the Bowen and Coastal areas were determined to be unsubstantiated and no further action was required other than flushing in some cases.

# 6. DWQMP Review

There was no official review of the DWQMP completed in the 2022-2023 year. A review is due 4 October 2023.

An amendment application, for version 3.1, was submitted in April 2022 and in September 2022 a Show Cause Notice was issued inviting Council to make submissions as to why it should not be directed to amend its approved DWQMP in a stated way. The submission was made by Council and the amendment application was not agreed to in November 2022. As such, the plan approved in December 2021, Version 3, is still the current version. Council sought input to ensure compliance with the regulatory requirements prior to submission of the review and amendment in October 2023.

Full details of the 2023 review will be included in the 2023-2024 report.

# Appendix A – Summary of Compliance with Water Quality Criteria

The results from the verification monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the *Water Quality and Reporting Guideline for a Drinking Water Service*.

Verification monitoring was carried out as per the program stated in the DWQMP.

A summary of water quality characteristics for each scheme are contained in the following tables.

**Table 3a - Verification monitoring results - Bowen Scheme Potable Water**

| | Parameter | Unit of Measure | LOR | No. Samples to be collected from Approved Plan | Actual Total Samples Collected | No. Samples in which parameter was detected | ADWG Aesthetic (Health) Guideline | No. of samples exceeding water quality criteria | Minimum Result | Maximum Result | Average of Results | 95th Percentile | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In House Test Results | pH | mg/L | 0.1 | 104 | 406 | 406 | 6.5-8.5 | 0 | 7.0 | 7.8 | 7.4 | | |
| | Turbidity | NTU | 0.01 | 104 | 405 | 405 | 5 | 0 | 0.02 | 0.55 | 0.10 | | |
| | Conductivity | µS/cm | 1 | | 144 | 144 | | | 300 | 498 | 397 | | |
| | Colour | Pt/Co | 1 | 104 | 406 | 289 | 15 | 0 | 0 | 6 | 0.9 | | |
| | Free chlorine residual | mg/L | 0.1 | | 405 | 405 | | | 0.25 | 3.73 | 1.77 | | |
| | Total chlorine residual | mg/L | 0.1 | | 96 | 96 | | | 0.5 | 4.1 | 2.10 | | |
| | Alkalinity | mg/L | 0.1 | 104 | 143 | 143 | | | 45 | 105 | 84 | | |
| | Total hardness | mg/L | 0.1 | 104 | 143 | 143 | 200 | 0 | 56 | 120 | 85 | | |
| | Iron | mg/L | 0.01 | 104 | 406 | 393 | 0.3 | 0 | 0.0 | 0.04 | 0.017 | | |
| | Manganese | mg/L | 0.001 | 104 | 406 | 391 | 0.1 (0.5) | **2** | 0.000 | *0.139* | 0.005 | | |
| | Aluminium | mg/L | 0.001 | 104 | 406 | 406 | 0.2 | 0 | 0.008 | 0.058 | 0.021 | | |
| NATA Lab Results | pH | mg/L | 0.1 | 24 | 23 | 23 | 6.5-8.5 | 0 | 6.81 | 7.6 | 7.1 | 7.4 | |
| | Turbidity | NTU | 1 | 24 | 23 | 0 | 5 | 0 | <1 | <1 | <1 | <1 | |
| | Colour | Pt/Co | 1 | 24 | 23 | 0 | 15 | 0 | <1 | <1 | <1 | <1 | |
| | Conductivity | µS/cm | 5 | 24 | 23 | 23 | | | 340 | 520 | 425 | 499 | |
| | Alkalinity | mg/L | 5 | 24 | 23 | 23 | | | 72 | 97 | 82 | 97 | |
| | Total hardness | mg/L | 5 | 24 | 23 | 23 | 200 | 0 | 66 | 102 | 86 | 101 | |
| | Total dissolved solids | mg/L | 10 | 24 | 23 | 23 | | 0 | 190 | 280 | 230 | 269 | |
| | Chloride | mg/L | 2 | 24 | 23 | 23 | 250 | 0 | 54 | 88 | 71.6 | 85.0 | |
| | Sulphate | mg/L | 2 | 24 | 23 | 23 | 250 (500) | 0 | 11 | 17 | 13.5 | 16.9 | |
| | Fluoride | mg/L | 0.05 | 24 | 23 | 23 | (1.5) | 0 | 0.08 | 0.12 | 0.10 | 0.12 | |
| | Nitrate | mg/L | 0.05 | 24 | 23 | 21 | (50) | 0 | 0.05 | 0.53 | 0.21 | 0.44 | |
| | Silica | mg/L | 5 | 24 | 23 | 23 | 80 | 0 | 13 | 16 | 14.5 | 16.0 | |
| | Sodium | mg/L | 0.05 | 24 | 23 | 23 | 180 | 0 | 42 | 62 | 49.7 | 58.9 | |
| | Potassium | mg/L | 0.05 | 24 | 23 | 23 | | | 2.4 | 3.6 | 2.8 | 3.5 | |
| | Calcium | mg/L | 0.05 | 24 | 23 | 23 | | | 14 | 23 | 18.8 | 22.9 | |
| | Magnesium | mg/L | 0.05 | 24 | 23 | 23 | | | 7.6 | 11 | 9.4 | 11.0 | |
| | Chlorate | mg/L | 0.01 | 24 | 23 | 23 | | | 0.20 | *0.83* | 0.46 | 0.77 | |
| | Aluminium | mg/L | 0.01 | 24 | 23 | 23 | 0.2 | 0 | 0.01 | 0.046 | 0.025 | 0.043 | |
| | Antimony | mg/L | 0.0001 | 24 | 23 | 0 | (0.003) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Arsenic | mg/L | 0.0001 | 24 | 23 | 23 | (0.01) | 0 | 0.0002 | 0.0005 | 0.0003 | 0.0005 | |
| | Barium | mg/L | 0.001 | 24 | 23 | 22 | (2) | 0 | 0.04 | 0.06 | 0.047 | 0.058 | |
| | Beryllium | mg/L | 0.0001 | 24 | 23 | 0 | (0.06) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Boron | mg/L | 0.001 | 24 | 23 | 23 | (4.0) | 0 | 0.026 | 0.035 | 0.030 | 0.035 | |
| | Cadmium | mg/L | 0.0001 | 24 | 23 | 0 | (0.002) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Chromium | mg/L | 0.0001 | 24 | 23 | 6 | (0.05) | 0 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | |
| | Cobalt | mg/L | 0.0001 | 24 | 23 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Copper | mg/L | 0.001 | 24 | 23 | 23 | 1 (2) | 0 | 0.004 | 0.12 | 0.0329 | 0.0647 | |
| | Iron | mg/L | 0.005 | 24 | 23 | 9 | 0.3 | 0 | 0.006 | 0.016 | 0.0107 | 0.0156 | |
| | Lead | mg/L | 0.0001 | 24 | 23 | 20 | (0.01) | 0 | 0.0001 | 0.0018 | 0.0005 | 0.0015 | |
| | Mercury | mg/L | 0.0001 | 24 | 23 | 0 | (0.001) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Manganese | mg/L | 0.001 | 24 | 23 | 23 | 0.1 (0.5) | 0 | 0.0001 | 0.031 | 0.0037 | 0.0179 | |
| | Molybdenum | mg/L | 0.0001 | 24 | 23 | 23 | (0.05) | 0 | 0.0002 | 0.0004 | 0.0003 | 0.0004 | |
| | Nickel | mg/L | 0.0001 | 24 | 23 | 22 | (0.02) | 0 | 0.0001 | 0.0005 | 0.0003 | 0.0004 | |
| | Selenium | mg/L | 0.0001 | 24 | 23 | 0 | (0.01) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Silver | mg/L | 0.001 | 24 | 23 | 0 | (0.1) | 0 | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Strontium | mg/L | 0.01 | 24 | 23 | 23 | | | 0.15 | 0.26 | 0.203 | 0.249 | |
| | Thallium | mg/L | 0.0001 | 24 | 23 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Tin | mg/L | 0.0001 | 24 | 23 | 3 | | | 0.0001 | 0.0043 | 0.0016 | 0.0039 | |
| | Titanium | mg/L | 0.001 | 24 | 23 | 0 | | | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Uranium | mg/L | 0.0001 | 24 | 23 | 0 | (0.017) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Vanadium | mg/L | 0.0001 | 24 | 23 | 19 | | | 0.0001 | 0.0003 | 0.0002 | 0.0002 | |
| | Zinc | mg/L | 0.001 | 24 | 23 | 23 | 3 | 0 | 0.002 | 0.02 | 0.0063 | 0.0138 | |
| | Chloroform | µg/L | 1 | 24 | 23 | 23 | | 0 | 20.0 | 96.0 | 43.1 | | |
| | Bromodichloro methane | µg/L | 1 | 24 | 23 | 23 | | 0 | 26.0 | 61.0 | 37.4 | | |
| | Dibromochloro methane | µg/L | 1 | 24 | 23 | 23 | | 0 | 16.0 | 34.0 | 24.7 | | |
| | Bromoform | µg/L | 1 | 24 | 23 | 23 | | 0 | 2.0 | 5.0 | 3.1 | | |
| | Total THM's | µg/L | 1 | 24 | 23 | 23 | (250) | 0 | 70.0 | 190.0 | 107.5 | | |
| | PFOS + PFHxS | µg/L | 0.005 | 8 | 8 | 0 | 0.07 | 0 | <0.005 | <0.005 | <0.005 | | |
| | Methyl Isoborneol | ng/L | 1 | 2 | 5 | 1 | | | <2 | 3 | <2 | | |
| | Geosmin | ng/L | 1 | 2 | 5 | 3 | | | <2 | 6 | 2.6 | | |
| | ***Pesticide Residues*** - Dalapon (2,2-DPA) | µg/L | 0.2 | 2 | 2 | 2 | (500) | 0 | 0.7 | 2.1 | 1.4 | | Reticulated & Treated Refer QHFSS SSP0083684 |
| | Desethyl Atrazine | µg/L | 0.01 | 2 | 2 | 0 | 20 | 0 | <0.01 | <0.01 | <0.01 | | |
| | Atrazine, 2-hydroxyl | µg/L | 0.01 | 2 | 2 | 2 | 200 | 0 | 0.01 | 0.01 | 0.01 | | |
| | Metolachlor | µg/L | 0.02 | 2 | 2 | 0 | (300) | 0 | <0.02 | <0.02 | <0.02 | | |
| | Imazapic | µg/L | 0.01 | 2 | 2 | 0 | (1000) | 0 | <0.01 | <0.01 | <0.01 | | |
| | Triclopyr | µg/L | 0.07 | 2 | 2 | 0 | (0.02) | 0 | <0.07 | <0.07 | <0.07 | | |
| | Hexazinone | µg/L | 0.01 | 2 | 2 | 0 | (0.4) | 0 | <0.01 | <0.01 | <0.01 | | |
| | Others detected:- | µg/L | | | | | | | | | | | |

**Table 3b - Verification monitoring results - Coastal Scheme Potable Water**

| | Parameter | Unit of Measure | LOR | No. Samples to be collected from Approved Plan | Actual Total Samples Collected | No. Samples in which parameter was detected | ADWG Aesthetic (Health) Guideline | No. of samples exceeding water quality criteria | Minimum Result | Maximum Result | Average of Results | 95th Percentile | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In House Test Results | pH | mg/L | 0.1 | 104 | 381 | 381 | 6.5-8.5 | 0 | 7.1 | 8.5 | 7.4 | | |
| | Turbidity | NTU | 0.01 | 104 | 382 | 382 | 5 | 0 | 0.06 | 0.201 | 0.11 | | |
| | Conductivity | µS/cm | 1 | | 110 | 110 | | | 235 | 984 | 513 | | |
| | Colour | Pt/Co | 1 | 104 | 383 | 68 | 15 | 0 | 0 | 2 | 0.2 | | |
| | Free chlorine residual | mg/L | 0.1 | | 379 | 379 | | | 0.28 | 1.99 | 1.20 | | |
| | Total chlorine residual | mg/L | 0.1 | | 64 | 64 | | | 0.92 | 2.06 | 1.42 | | |
| | Alkalinity | mg/L | 0.1 | 104 | 111 | 111 | | | 59 | 129 | 104 | | |
| | Total hardness | mg/L | 0.1 | 104 | 111 | 111 | 200 | 0 | 1 | 160 | 118 | | |
| | Iron | mg/L | 0.01 | 104 | 377 | 342 | 0.3 | 0 | 0 | 0.07 | 0.01 | | |
| | Manganese | mg/L | 0.001 | 104 | 382 | 313 | 0.1 (0.5) | 0 | 0 | 0.069 | 0.011 | | |
| | Aluminium | mg/L | 0.001 | 104 | 379 | 379 | 0.2 | 0 | 0.008 | 0.161 | 0.052 | | |
| NATA Lab Results | pH | mg/L | 0.1 | 24 | 24 | 24 | 6.5-8.5 | 0 | 7.0 | 7.9 | 7.4 | 7.7 | |
| | Turbidity | NTU | 1 | 24 | 24 | 0 | 5 | 0 | <1 | <1 | <1 | <1 | |
| | Colour | Pt/Co | 1 | 24 | 24 | 0 | 15 | 0 | <1 | <1 | <1 | <1 | |
| | Conductivity | µS/cm | 5 | 24 | 24 | 24 | | | 450 | 640 | 523 | 570 | |
| | Alkalinity | mg/L | 5 | 24 | 24 | 24 | | | 84 | 110 | 97 | 109 | |
| | Total hardness | mg/L | 5 | 24 | 24 | 24 | 200 | 0 | 105 | 147 | 119 | 138 | |
| | Total dissolved solids | mg/L | 10 | 24 | 24 | 24 | | 0 | 270 | 360 | 306 | 330 | |
| | Chloride | mg/L | 2 | 24 | 24 | 24 | 250 | 0 | 68 | 130 | 91.2 | 110.0 | |
| | Sulphate | mg/L | 2 | 24 | 24 | 24 | 250 (500) | 0 | 6.4 | 17 | 11.5 | 14.9 | |
| | Fluoride | mg/L | 0.05 | 24 | 24 | 24 | (1.5) | 0 | 0.08 | 0.12 | 0.10 | 0.12 | |
| | Nitrate | mg/L | 0.05 | 24 | 24 | 24 | (50) | 0 | 4.8 | 8.4 | 6.98 | 8.19 | |
| | Silica | mg/L | 5 | 24 | 24 | 24 | 80 | 0 | 35 | 49 | 40.58 | 46.70 | |
| | Sodium | mg/L | 0.05 | 24 | 24 | 24 | 180 | 0 | 48 | 66 | 56.21 | 61.85 | |
| | Potassium | mg/L | 0.05 | 24 | 24 | 24 | | | 1.1 | 1.9 | 1.41 | 1.80 | |
| | Calcium | mg/L | 0.05 | 24 | 24 | 24 | | | 22 | 30 | 24.83 | 28.85 | |
| | Magnesium | mg/L | 0.05 | 24 | 24 | 24 | | | 12 | 18 | 14.00 | 16.00 | |
| | Chlorate | mg/L | 0.01 | 24 | 24 | 24 | | | 0.09 | 0.34 | 0.224 | 0.330 | |
| | Aluminium | mg/L | 0.01 | 24 | 24 | 24 | 0.2 | 0 | 0.038 | 0.078 | 0.059 | 0.077 | |
| | Antimony | mg/L | 0.0001 | 24 | 24 | 0 | (0.003) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Arsenic | mg/L | 0.0001 | 24 | 24 | 24 | (0.01) | 0 | 0.0002 | 0.0004 | 0.00027 | 0.00039 | |
| | Barium | mg/L | 0.001 | 24 | 24 | 24 | (2) | 0 | 0.027 | 0.043 | 0.0330 | 0.0410 | |
| | Beryllium | mg/L | 0.0001 | 24 | 24 | 0 | (0.06) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Boron | mg/L | 0.001 | 24 | 24 | 24 | (4.0) | 0 | 0.022 | 0.032 | 0.0255 | 0.0290 | |
| | Cadmium | mg/L | 0.0001 | 24 | 24 | 0 | (0.002) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Chromium | mg/L | 0.0001 | 24 | 24 | 1 | (0.05) | 0 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | |
| | Cobalt | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Copper | mg/L | 0.001 | 24 | 24 | 12 | 1 (2) | 0 | 0.001 | 0.005 | 0.0028 | 0.0050 | |
| | Iron | mg/L | 0.005 | 24 | 24 | 5 | 0.3 | 0 | 0.005 | 0.008 | 0.0066 | 0.0078 | |
| | Lead | mg/L | 0.0001 | 24 | 24 | 12 | (0.01) | 0 | 0.0001 | 0.0004 | 0.00023 | 0.00040 | |
| | Mercury | mg/L | 0.0001 | 24 | 24 | 0 | (0.001) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Manganese | mg/L | 0.001 | 24 | 24 | 24 | 0.1 (0.5) | 0 | 0.0004 | 0.0055 | 0.0013 | 0.0029 | |
| | Molybdenum | mg/L | 0.0001 | 24 | 24 | 24 | (0.05) | 0 | 0.0002 | 0.0003 | 0.0002 | 0.0003 | |
| | Nickel | mg/L | 0.0001 | 24 | 24 | 11 | (0.02) | 0 | 0.0001 | 0.0005 | 0.0002 | 0.0004 | |
| | Selenium | mg/L | 0.0001 | 24 | 24 | 22 | (0.01) | 0 | 0.0001 | 0.0003 | 0.00020 | 0.00030 | |
| | Silver | mg/L | 0.001 | 24 | 24 | 0 | (0.1) | 0 | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Strontium | mg/L | 0.01 | 24 | 24 | 24 | | | 0.24 | 0.39 | 0.315 | 0.377 | |
| | Thallium | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Tin | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Titanium | mg/L | 0.001 | 24 | 24 | 0 | | | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Uranium | mg/L | 0.0001 | 24 | 24 | 6 | (0.017) | 0 | 0.0001 | 0.0001 | 0.00010 | 0.00010 | |
| | Vanadium | mg/L | 0.0001 | 24 | 24 | 24 | | | 0.0005 | 0.0025 | 0.0015 | 0.0024 | |
| | Zinc | mg/L | 0.001 | 24 | 24 | 15 | 3 | 0 | 0.001 | 0.024 | 0.0069 | 0.0198 | |
| | Chloroform | µg/L | 1 | 24 | 24 | 24 | | 0 | 2.0 | 8.0 | 3.8 | | |
| | Bromodichloro methane | µg/L | 1 | 24 | 24 | 24 | | 0 | 6.0 | 20.0 | 11.3 | | |
| | Dibromochloro methane | µg/L | 1 | 24 | 24 | 24 | | 0 | 16.0 | 34.0 | 22.5 | | |
| | Bromoform | µg/L | 1 | 24 | 24 | 24 | | 0 | 9.0 | 22.0 | 13.7 | | |
| | Total THM's | µg/L | 1 | 24 | 24 | 24 | (250) | 0 | 36.0 | 79.0 | 51.3 | | |
| | PFOS + PFHxS | µg/L | 0.005 | 8 | 8 | 0 | 0.07 | 0 | <0.005 | <0.005 | <0.005 | | 6:2 FTS Treated Nov 2022 |
| | Methyl Isoborneol | ng/L | 1 | 2 | 2 | 0 | | 0 | <2 | <2 | <2 | | |
| | Geosmin | ng/L | 1 | 2 | 2 | 0 | | 0 | <2 | <2 | <2 | | |
| | ***Pesticide Residues*** - Dalapon (2,2-DPA) | µg/L | 0.2 | 2 | 2 | 0 | (500) | 0 | <0.2 | <0.2 | <0.2 | | Reticulated & Treated Refer QHFSS SSP0083684 |
| | Desethyl Atrazine | µg/L | 0.01 | 2 | 2 | 0 | 20 | 0 | <0.01 | <0.01 | <0.01 | | |
| | Atrazine, 2-hydroxyl | µg/L | 0.01 | 2 | 2 | 2 | 200 | 0 | 0.01 | 0.03 | 0.02 | | |
| | Metolachlor | µg/L | 0.02 | 2 | 2 | 0 | (300) | 0 | <0.02 | <0.02 | <0.02 | | |
| | Imazapic | µg/L | 0.01 | 2 | 2 | 0 | (1000) | 0 | <0.01 | <0.01 | <0.01 | | |
| | Triclopyr | µg/L | 0.07 | 2 | 2 | 0 | (0.02) | 0 | <0.07 | <0.07 | <0.07 | | |
| | Hexazinone | µg/L | 0.01 | 2 | 2 | 1 | (0.4) | 0 | 0.01 | 0.01 | 0.01 | | |
| | Others detected:- | µg/L | | | | | | | | | | | |

**Table 3c - Verification monitoring results - Collinsville Scheme Potable Water**

| | Parameter | Unit of Measure | LOR | No. Samples to be collected from Approved Plan | Actual Total Samples Collected | No. Samples in which parameter was detected | ADWG Aesthetic (Health) Guideline | No. of samples exceeding water quality criteria | Minimum Result | Maximum Result | Average of Results | 95th Percentile | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In House Test Results | pH | mg/L | 0.1 | 104 | 412 | 412 | 6.5-8.5 | 0 | 6.76 | 7.87 | 7.4 | | |
| | Turbidity | NTU | 0.01 | 104 | 411 | 411 | 5 | 0 | 0.05 | 1.12 | 0.16 | | |
| | Conductivity | µS/cm | 1 | | 150 | 150 | | | 113 | 250 | 167 | | |
| | Colour | Pt/Co | 1 | 104 | 405 | 162 | 15 | 0 | 0 | 14 | 1.3 | | |
| | Free chlorine residual | mg/L | 0.1 | | 406 | 406 | | | 0.2 | 2.14 | 1.1 | | |
| | Total chlorine residual | mg/L | 0.1 | | 401 | 100 | | | 0.198 | 3.25 | 1.4 | | |
| | Alkalinity | mg/L | 0.1 | 104 | 149 | 149 | | | 0.45 | 83 | 45 | | |
| | Total hardness | mg/L | 0.1 | 104 | 0 | | 200 | | | | | | |
| | Iron | mg/L | 0.01 | 104 | 405 | 398 | 0.3 | 0 | 0 | 0.05 | 0.017 | | |
| | Manganese | mg/L | 0.001 | 104 | 405 | 384 | 0.1 (0.5) | 0 | 0 | 0.014 | 0.003 | | |
| | Aluminium | mg/L | 0.001 | 104 | 412 | 412 | 0.2 | 0 | 0.008 | 0.266 | 0.020 | | |
| NATA Lab Results | pH | mg/L | 0.1 | 24 | 24 | 24 | 6.5-8.5 | 0 | 6.6 | 7.3 | 6.9 | 7.2 | |
| | Turbidity | NTU | 1 | 24 | 24 | 0 | 5 | 0 | <1 | <1 | <1 | <1 | |
| | Colour | Pt/Co | 1 | 24 | 24 | 0 | 15 | 0 | <1 | <1 | <1 | <1 | |
| | Conductivity | µS/cm | 5 | 24 | 24 | 24 | | | 150 | 280 | 192 | 274 | |
| | Alkalinity | mg/L | 5 | 24 | 24 | 24 | | | 28 | 74 | 52 | 73 | |
| | Total hardness | mg/L | 5 | 24 | 24 | 24 | 200 | 0 | 38 | 77 | 54 | 76 | |
| | Total dissolved solids | mg/L | 10 | 24 | 24 | 24 | | 0 | 92 | 170 | 116 | 166 | |
| | Chloride | mg/L | 2 | 24 | 24 | 24 | 250 | 0 | 12 | 21 | 16.8 | 20.9 | |
| | Sulphate | mg/L | 2 | 24 | 24 | 24 | 250 (500) | 0 | 1.7 | 38 | 17.7 | 34.9 | |
| | Fluoride | mg/L | 0.05 | 24 | 24 | 24 | (1.5) | 0 | 0.03 | 0.08 | 0.053 | 0.080 | |
| | Nitrate | mg/L | 0.05 | 24 | 24 | 24 | (50) | 0 | 0.08 | 0.46 | 0.204 | 0.327 | |
| | Silica | mg/L | 5 | 24 | 24 | 24 | 80 | 0 | 10 | 17 | 14.2 | 16.9 | |
| | Sodium | mg/L | 0.05 | 24 | 24 | 24 | 180 | 0 | 12 | 25 | 15.7 | 23.1 | |
| | Potassium | mg/L | 0.05 | 24 | 24 | 24 | | | 0.93 | 2.1 | 1.40 | 2.00 | |
| | Calcium | mg/L | 0.05 | 24 | 24 | 24 | | | 9.8 | 20 | 13.8 | 20.0 | |
| | Magnesium | mg/L | 0.05 | 24 | 24 | 24 | | | 3.3 | 6.6 | 4.85 | 6.49 | |
| | Chlorate | mg/L | 0.01 | 24 | 24 | 24 | | | 0.13 | 0.36 | 0.218 | 0.344 | |
| | Aluminium | mg/L | 0.01 | 24 | 24 | 24 | 0.2 | 0 | 0.008 | 0.052 | 0.0208 | 0.0307 | |
| | Antimony | mg/L | 0.0001 | 24 | 24 | 0 | (0.003) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Arsenic | mg/L | 0.0001 | 24 | 24 | 17 | (0.01) | 0 | 0.0001 | 0.0003 | 0.00019 | 0.00030 | |
| | Barium | mg/L | 0.001 | 24 | 24 | 24 | (2) | 0 | 0.015 | 0.042 | 0.0229 | 0.0390 | |
| | Beryllium | mg/L | 0.0001 | 24 | 24 | 0 | (0.06) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Boron | mg/L | 0.001 | 24 | 24 | 24 | (4.0) | 0 | 0.011 | 0.18 | 0.023 | 0.023 | |
| | Cadmium | mg/L | 0.0001 | 24 | 24 | 0 | (0.002) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Chromium | mg/L | 0.0001 | 24 | 24 | 1 | (0.05) | 0 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | |
| | Cobalt | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Copper | mg/L | 0.001 | 24 | 24 | 24 | 1 (2) | 0 | 0.001 | 0.057 | 0.0105 | 0.0327 | |
| | Iron | mg/L | 0.005 | 24 | 24 | 12 | 0.3 | 0 | 0.005 | 0.029 | 0.0132 | 0.0263 | |
| | Lead | mg/L | 0.0001 | 24 | 24 | 10 | (0.01) | 0 | 0.0001 | 0.0002 | 0.00013 | 0.0002 | |
| | Mercury | mg/L | 0.0001 | 24 | 24 | 0 | (0.001) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Manganese | mg/L | 0.001 | 24 | 24 | 24 | 0.1 (0.5) | 0 | 0.0002 | 0.0063 | 0.0015 | 0.0032 | |
| | Molybdenum | mg/L | 0.0001 | 24 | 24 | 24 | (0.05) | 0 | 0.0002 | 0.0006 | 0.0003 | 0.0006 | |
| | Nickel | mg/L | 0.0001 | 24 | 24 | 22 | (0.02) | 0 | 0.0001 | 0.0003 | 0.00021 | 0.00030 | |
| | Selenium | mg/L | 0.0001 | 24 | 24 | 0 | (0.01) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Silver | mg/L | 0.001 | 24 | 24 | 0 | (0.1) | 0 | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Strontium | mg/L | 0.01 | 24 | 24 | 24 | | | 0.077 | 0.18 | 0.116 | 0.180 | |
| | Thallium | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Tin | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Titanium | mg/L | 0.001 | 24 | 24 | 0 | | | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Uranium | mg/L | 0.0001 | 24 | 24 | 0 | (0.017) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Vanadium | mg/L | 0.0001 | 24 | 24 | 24 | | | 0.0005 | 0.0032 | 0.0016 | 0.0029 | |
| | Zinc | mg/L | 0.001 | 24 | 24 | 24 | 3 | 0 | 0.001 | 0.023 | 0.0075 | 0.0184 | |
| | Chloroform | µg/L | 1 | 24 | 24 | 24 | | 0 | 8.0 | 62.0 | 28.8 | | |
| | Bromodichloro methane | µg/L | 1 | 24 | 24 | 24 | | 0 | 8.0 | 22.0 | 13.8 | | |
| | Dibromochloro methane | µg/L | 1 | 24 | 24 | 24 | | 0 | 2.0 | 8.0 | 5.0 | | |
| | Bromoform | µg/L | 1 | 24 | 24 | 1 | | 0 | 1.0 | 1.0 | 1.0 | | |
| | Total THM's | µg/L | 1 | 24 | 24 | 24 | (250) | 0 | 21.0 | 90.0 | 47.8 | | |
| | PFOS + PFHxS | µg/L | 0.005 | 8 | 8 | 0 | 0.07 | 0 | <0.005 | <0.005 | <0.005 | | Retic & Treated 6:2 FTS present Nov 2022 |
| | Methyl Isoborneol | ng/L | 1 | 2 | 2 | 0 | | 0 | <2 | <2 | <2 | | |
| | Geosmin | ng/L | 1 | 2 | 2 | 0 | | 0 | <2 | <2 | <2 | | |
| | ***Pesticide Residues*** - Dalapon (2,2-DPA) | µg/L | 0.2 | 2 | 2 | 2 | (500) | 0 | 0.2 | 0.5 | 0.4 | | Reticulated & Treated Refer QHFSS SSP0083684 |
| | Desethyl Atrazine | µg/L | 0.01 | 2 | 2 | 0 | 20 | 0 | <0.01 | <0.01 | <0.01 | | |
| | Atrazine, 2-hydroxyl | µg/L | 0.01 | 2 | 2 | 0 | 200 | 0 | <0.01 | <0.01 | <0.01 | | |
| | Metolachlor | µg/L | 0.02 | 2 | 2 | 0 | (300) | 0 | <0.02 | <0.02 | <0.02 | | |
| | Imazapic | µg/L | 0.01 | 2 | 2 | 0 | (1000) | 0 | <0.01 | <0.01 | <0.01 | | |
| | Triclopyr | µg/L | 0.07 | 2 | 2 | 0 | (0.02) | 0 | <0.07 | <0.07 | <0.07 | | |
| | Hexazinone | µg/L | 0.01 | 2 | 2 | 0 | (0.4) | 0 | <0.01 | <0.01 | <0.01 | | |
| | Others detected:- | µg/L | | | | | | | | | | | |

**Table 3d - Verification monitoring results - Proserpine Scheme Potable Water**

| | Parameter | Unit of Measure | LOR | No. Samples to be collected from Approved Plan | Actual Total Samples Collected | No. Samples in which parameter was detected | ADWG Aesthetic (Health) Guideline | No. of samples exceeding water quality criteria | Minimum Result | Maximum Result | Average of Results | 95th Percentile | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In House Test Results | pH | mg/L | 0.1 | 104 | 390 | 390 | 6.5-8.5 | 0 | 7.1 | 7.9 | 7.6 | | |
| | Turbidity | NTU | 0.01 | 104 | 390 | 390 | 5 | 0 | 0.05 | 0.70 | 0.10 | | |
| | Conductivity | µS/cm | 1 | | 124 | 124 | | | 420 | 703 | 499 | | |
| | Colour | Pt/Co | 1 | 104 | 390 | 54 | 15 | 0 | 0 | 1.5 | 0.2 | | |
| | Free chlorine residual | mg/L | 0.1 | | 386 | 386 | | | 0.5 | 2.05 | 1.13 | | |
| | Total chlorine residual | mg/L | 0.1 | | 76 | 76 | | | 0.65 | 2.1 | 1.30 | | |
| | Alkalinity | mg/L | 0.1 | 104 | 123 | 123 | | | 48.6 | 162.8 | 108 | | |
| | Total hardness | mg/L | 0.1 | 104 | 121 | 121 | 200 | 0 | 15.2 | 158 | 108 | | |
| | Iron | mg/L | 0.01 | 104 | 388 | 357 | 0.3 | 0 | 0 | 0.05 | 0.013 | | |
| | Manganese | mg/L | 0.001 | 104 | 388 | 326 | 0.1 (0.5) | 0 | 0 | 0.075 | 0.008 | | |
| | Aluminium | mg/L | 0.001 | 104 | 388 | 388 | 0.2 | **1** | 0.007 | *0.259* | 0.073 | | |
| NATA Lab Results | pH | mg/L | 0.1 | 24 | 24 | 24 | 6.5-8.5 | 0 | 7.2 | 8.0 | 7.6 | 7.9 | |
| | Turbidity | NTU | 1 | 24 | 24 | 0 | 5 | 0 | <1 | <1 | <1 | <1 | |
| | Colour | Pt/Co | 1 | 24 | 24 | 0 | 15 | 0 | <1 | <1 | <1 | <1 | |
| | Conductivity | µS/cm | 5 | 24 | 24 | 24 | | | 430 | 520 | 488 | 519 | |
| | Alkalinity | mg/L | 5 | 24 | 24 | 24 | | | 98 | 120 | 108 | 120 | |
| | Total hardness | mg/L | 5 | 24 | 24 | 24 | 200 | 0 | 95 | 113 | 108 | 112 | |
| | Total dissolved solids | mg/L | 10 | 24 | 24 | 24 | | 0 | 260 | 330 | 300.0 | 320.0 | |
| | Chloride | mg/L | 2 | 24 | 24 | 24 | 250 | 0 | 63 | 80 | 74.0 | 79.0 | |
| | Sulphate | mg/L | 2 | 24 | 24 | 24 | 250 (500) | 0 | 12 | 20 | 14.7 | 18.9 | |
| | Fluoride | mg/L | 0.05 | 24 | 24 | 24 | (1.5) | 0 | 0.1 | 0.14 | 0.120 | 0.130 | |
| | Nitrate | mg/L | 0.05 | 24 | 24 | 24 | (50) | 0 | 4.4 | 8.9 | 7.29 | 8.69 | |
| | Silica | mg/L | 5 | 24 | 24 | 24 | 80 | 0 | 33 | 54 | 46.1 | 52.9 | |
| | Sodium | mg/L | 0.05 | 24 | 24 | 24 | 180 | 0 | 46 | 62 | 56.3 | 61.0 | |
| | Potassium | mg/L | 0.05 | 24 | 24 | 24 | | | 0.86 | 1.5 | 1.05 | 1.30 | |
| | Calcium | mg/L | 0.05 | 24 | 24 | 24 | | | 19 | 23 | 21.92 | 23.00 | |
| | Magnesium | mg/L | 0.05 | 24 | 24 | 24 | | | 12 | 14 | 13.13 | 14.00 | |
| | Chlorate | mg/L | 0.01 | 24 | 24 | 24 | | | 0.18 | 0.47 | 0.277 | 0.389 | |
| | Aluminium | mg/L | 0.01 | 24 | 24 | 24 | 0.2 | 0 | 0.006 | 0.16 | 0.083 | 0.149 | |
| | Antimony | mg/L | 0.0001 | 24 | 24 | 0 | (0.003) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Arsenic | mg/L | 0.0001 | 24 | 24 | 24 | (0.01) | 0 | 0.0002 | 0.0004 | 0.0003 | 0.0004 | |
| | Barium | mg/L | 0.001 | 24 | 24 | 24 | (2) | 0 | 0.022 | 0.031 | 0.026 | 0.030 | |
| | Beryllium | mg/L | 0.0001 | 24 | 24 | 0 | (0.06) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Boron | mg/L | 0.001 | 24 | 24 | 24 | (4.0) | 0 | 0.024 | 0.033 | 0.0269 | 0.0319 | |
| | Cadmium | mg/L | 0.0001 | 24 | 24 | 0 | (0.002) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Chromium | mg/L | 0.0001 | 24 | 24 | 1 | (0.05) | 0 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | |
| | Cobalt | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Copper | mg/L | 0.001 | 24 | 24 | 12 | 1 (2) | 0 | 0.001 | 0.003 | 0.0018 | 0.0030 | |
| | Iron | mg/L | 0.005 | 24 | 24 | 1 | 0.3 | 0 | 0.007 | 0.007 | 0.007 | 0.007 | |
| | Lead | mg/L | 0.0001 | 24 | 24 | 2 | (0.01) | 0 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | |
| | Mercury | mg/L | 0.0001 | 24 | 24 | 0 | (0.001) | 0 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Manganese | mg/L | 0.001 | 24 | 24 | 24 | 0.1 (0.5) | 0 | 0.0002 | 0.0031 | 0.00085 | 0.00218 | |
| | Molybdenum | mg/L | 0.0001 | 24 | 24 | 24 | (0.05) | 0 | 0.0002 | 0.0003 | 0.00021 | 0.00029 | |
| | Nickel | mg/L | 0.0001 | 24 | 24 | 10 | (0.02) | 0 | 0.0001 | 0.0016 | 0.00033 | 0.00097 | |
| | Selenium | mg/L | 0.0001 | 24 | 24 | 24 | (0.01) | 0 | 0.0002 | 0.0004 | 0.00032 | 0.00040 | |
| | Silver | mg/L | 0.001 | 24 | 24 | 0 | (0.1) | 0 | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Strontium | mg/L | 0.01 | 24 | 24 | 24 | | | 0.24 | 0.31 | 0.285 | 0.300 | |
| | Thallium | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Tin | mg/L | 0.0001 | 24 | 24 | 0 | | | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| | Titanium | mg/L | 0.001 | 24 | 24 | 0 | | | <0.001 | <0.001 | <0.001 | <0.001 | |
| | Uranium | mg/L | 0.0001 | 24 | 24 | 23 | (0.017) | 0 | 0.0001 | 0.0002 | 0.00013 | 0.00020 | |
| | Vanadium | mg/L | 0.0001 | 24 | 24 | 24 | | | 0.0015 | 0.0036 | 0.00259 | 0.00336 | |
| | Zinc | mg/L | 0.001 | 24 | 24 | 12 | 3 | 0 | 0.001 | 0.002 | 0.0016 | 0.0020 | |
| | Chloroform | µg/L | 1 | 24 | 24 | 21 | | 0 | 1.0 | 11.0 | 3.0 | | |
| | Bromodichloro methane | µg/L | 1 | 24 | 24 | 24 | | 0 | 3.0 | 22.0 | 8.6 | | |
| | Dibromochloro methane | µg/L | 1 | 24 | 24 | 24 | | 0 | 8.0 | 34.0 | 18.0 | | |
| | Bromoform | µg/L | 1 | 24 | 24 | 24 | | 0 | 8.0 | 20.0 | 12.6 | | |
| | Total THM's | µg/L | 1 | 24 | 24 | 24 | (250) | 0 | 22.0 | 80.0 | 42.0 | | |
| | PFOS + PFHxS | µg/L | 0.005 | 8 | 8 | 0 | 0.07 | 0 | <0.005 | <0.005 | <0.005 | | Retic 6:2 FTS present Nov 2022, Feb 2023 |
| | Methyl Isoborneol | ng/L | 1 | 2 | 2 | 0 | | 0 | <2 | <2 | <2 | | |
| | Geosmin | ng/L | 1 | 2 | 2 | 0 | | 0 | <2 | <2 | <2 | | |
| | ***Pesticide Residues*** - Dalapon (2,2-DPA) | µg/L | 0.2 | 2 | 2 | 0 | (500) | 0 | <0.2 | <0.2 | <0.2 | | Reticulated & Treated Refer QHFSS SSP0083684 |
| | Desethyl Atrazine | µg/L | 0.01 | 2 | 2 | 1 | 20 | 0 | 0.01 | 0.01 | 0.01 | | |
| | Atrazine, 2-hydroxyl | µg/L | 0.01 | 2 | 2 | 1 | 200 | 0 | 0.01 | 0.01 | 0.01 | | |
| | Metolachlor | µg/L | 0.02 | 2 | 2 | 2 | (300) | 0 | 0.01 | 0.02 | 0.02 | | |
| | Imazapic | µg/L | 0.01 | 2 | 2 | 0 | (1000) | 0 | <0.01 | <0.01 | <0.01 | | |
| | Triclopyr | µg/L | 0.07 | 2 | 2 | 0 | (0.02) | 0 | <0.07 | <0.07 | <0.07 | | |
| | Hexazinone | µg/L | 0.01 | 2 | 2 | 1 | (0.4) | 0 | 0.01 | 0.01 | 0.01 | | |
| | Others detected:- | µg/L | | | | | | | | | | | |

**Table 4 - Reticulation *E.coli* verification monitoring**

| Drinking water scheme: | Year | Month | No. of samples from Approved Plan | No. of samples collected | No. of samples collected in which E. coli is detected (i.e. a failure) | No. of samples collected in previous 12 month period | No. of failures for previous 12 month period | % of samples that comply | Compliance with 98% annual value |
|---|---|---|---|---|---|---|---|---|---|
| Bowen Scheme | 2022 | July | 21 | 22 | 0 | 256 | 0 | 100 | YES |
| | | Aug | 21 | 24 | 0 | 263 | 0 | 100 | YES |
| | | Sept | 21 | 21 | 0 | 262 | 0 | 100 | YES |
| | | Oct | 21 | 24 | 0 | 265 | 0 | 100 | YES |
| | | Nov | 21 | 21 | 0 | 262 | 0 | 100 | YES |
| | | Dec | 21 | 21 | 0 | 265 | 0 | 100 | YES |
| | 2023 | Jan | 21 | 24 | 0 | 268 | 0 | 100 | YES |
| | | Feb | 21 | 21 | 0 | 270 | 0 | 100 | YES |
| | | Mar | 21 | 26 | 0 | 270 | 0 | 100 | YES |
| | | Apr | 21 | 21 | 0 | 270 | 0 | 100 | YES |
| | | May | 21 | 24 | 0 | 271 | 0 | 100 | YES |
| | | June | 21 | 21 | 0 | 270 | 0 | 100 | YES |
| Coastal Scheme | 2022 | July | 20 | 20 | 0 | 237 | 0 | 100 | YES |
| | | Aug | 20 | 22 | 0 | 239 | 0 | 100 | YES |
| | | Sept | 20 | 19 | 0 | 235 | 0 | 100 | YES |
| | | Oct | 20 | 19 | 0 | 234 | 0 | 100 | YES |
| | | Nov | 20 | 26 | 0 | 240 | 0 | 100 | YES |
| | | Dec | 20 | 20 | 0 | 260 | 0 | 100 | YES |
| | 2023 | Jan | 20 | 20 | 0 | 242 | 0 | 100 | YES |
| | | Feb | 20 | 15 | 0 | 240 | 0 | 100 | YES |
| | | Mar | 20 | 25 | 0 | 247 | 0 | 100 | YES |
| | | Apr | 20 | 20 | 0 | 247 | 0 | 100 | YES |
| | | May | 20 | 23 | 0 | 253 | 0 | 100 | YES |
| | | June | 20 | 21 | 0 | 250 | 0 | 100 | YES |
| Collinsville Scheme | 2022 | July | 18 | 18 | 0 | 223 | 2 | 99.1 | YES |
| | | Aug | 18 | 21 | 0 | 228 | 2 | 99.1 | YES |
| | | Sept | 18 | 18 | 0 | 228 | 2 | 99.1 | YES |
| | | Oct | 18 | 21 | 0 | 231 | 2 | 99.1 | YES |
| | | Nov | 18 | 28 | 0 | 239 | 2 | 99.2 | YES |
| | | Dec | 18 | 18 | 0 | 242 | 2 | 99.2 | YES |
| | 2023 | Jan | 18 | 23 | 0 | 247 | 2 | 99.2 | YES |
| | | Feb | 18 | 18 | 0 | 250 | 2 | 99.2 | YES |
| | | Mar | 18 | 18 | 0 | 245 | 2 | 99.2 | YES |
| | | Apr | 18 | 18 | 0 | 240 | 0 | 100 | YES |
| | | May | 18 | 21 | 0 | 240 | 0 | 100 | YES |
| | | June | 18 | 18 | 0 | 240 | 0 | 100 | YES |
| Proserpine Scheme | 2022 | July | 18 | 19 | 0 | 244 | 0 | 100 | YES |
| | | Aug | 18 | 23 | 0 | 245 | 0 | 100 | YES |
| | | Sept | 18 | 19 | 0 | 245 | 0 | 100 | YES |
| | | Oct | 18 | 19 | 0 | 245 | 0 | 100 | YES |
| | | Nov | 18 | 24 | 0 | 247 | 0 | 100 | YES |
| | | Dec | 18 | 19 | 0 | 245 | 0 | 100 | YES |
| | 2023 | Jan | 18 | 24 | 0 | 250 | 0 | 100 | YES |
| | | Feb | 18 | 20 | 0 | 252 | 0 | 100 | YES |
| | | Mar | 18 | 19 | 0 | 246 | 0 | 100 | YES |
| | | Apr | 18 | 19 | 0 | 246 | 0 | 100 | YES |
| | | May | 18 | 23 | 0 | 250 | 0 | 100 | YES |
| | | June | 18 | 19 | 0 | 247 | 0 | 100 | YES |

| Table 5 - Raw Water Monitoring Results | | | | | |
|---|---|---|---|---|---|
| Parameter | Unit | Bowen Raw | Coastal Raw | Collinsville Raw | Proserpine Raw |
| Date Sampled | | 16/05/2023 | 16/05/2023 | 23/05/2023 | 16/05/2023 |
| Methyl Isoborneol (MIB) | ng/L | <2 | <2 | <2 | <2 |
| Geosmin | ng/L | <2 | <2 | <2 | <2 |
| Non Purgeable Organic Carbo | mg/L | 3.9 | 1.3 | 1.7 | 0.9 |
| Dissolved NPOC | mg/L | 3.7 | 1.3 | LA | 0.7 |
| Date Sampled | | 16/05/2023 | 16/05/2023 | 16/05/2023 | 16/05/2023 |
| Total Alpha Activity | Bq/L | <0.1 | <0.1 | <0.1 | <0.1 |
| Total Beta Activity | Bq/L | <0.1 | <0.1 | <0.1 | <0.1 |
| K40 Corrected Beta Activity | Bq/L | <0.1 | <0.1 | <0.1 | <0.1 |
| ***Herbicides*** - | | | | | |
| Metolachlor | µg/L | <0.02 | <0.02 | <0.02 | 0.03 |
| Bromacil | µg/L | <0.02 | <0.02 | <0.02 | 0.13 |
| Desethyl Atrazine | µg/L | 0.01 | 0.01 | <0.01 | 0.01 |
| Atrazine, 2-hydroxyl | µg/L | <0.01 | 0.03 | <0.01 | <0.01 |
| Hexazinone | µg/L | <0.01 | 0.02 | <0.01 | <0.01 |

| Table 6 - Bowen Raw Water Blue Green Algae Results | | |
|---|---|---|
| Bowen Raw Water Blue Green Algae (cells/mL) | | |
| 16/08/2022 | 4110 | |
| 15/11/2022 | 60000 | Toxins <0.03 ug/L |
| 21/02/2023 | 118400 | Toxins <0.03 ug/L |
| 16/05/2023 | 8000 | |

# Appendix B – Implementation of the DWQMP Risk Management Improvement Program

***APPENDIX B - Risk Management Improvement Plan***

Completed
Ongoing
Lastest comments

| Scheme Component / Sub-component | | Hazardous event | Hazard | Priority | Interim Action(s) | Short-term Action(s) | Long-term Action(s) | Original Target date/s | Revised Target Date | Cost | Responsibility | Actions Taken |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Catchment - Proserpine River** | **1** | Inadequate Water Supply - Bowen WTP | Supply loss & pump damage | Medium | Monitor flows and pump efficiencies. Replace pump impellers. Start design work on options. Completed | Remove sand from around spears and rock gabling in 2018 Completed | -Open water intake,<br>- major maintenance around spears (remove geo-fabric & rock repack) | - Nov 2018<br>- May 2019 | ~~- Aug 2019 (maintenance)~~<br>~~- June 2022~~<br>~~- Jun 2023~~<br>- Jun 2024 | Est $800K for intake $500K for river spear maint | Treatment Operations Manager, Planning & Assets Engineer, Capital Works Manager, Principal Engineer (Treatment) | Initial-Open water intake design work commenced and initial tender released. Preliminary works commenced.<br>2018-Open water intake utilising a diesel pump operational. Civil construction works delayed up to 3 years as tender prices significantly higher than anticipated. 2023 - Civil works now at concept stage, works progressing.<br>Maintenance done in 2018, will be carried out again 2019.<br>3 stage capital process-Building; electrical; mechanical; starting Jan 2022 Replacement of existing pumps underway<br>In place and operational.<br>Assessing electric pump to replace diesel pump - Ongoing<br>Maintenance of spears - ongoing<br>Future works - increase spear capacity, still in concept design, open water intake & options for bores beside river. |
| **Catchment - Proserpine Bores** | **30** | Inadequate Water Supply - Proserpine WTP | Supply loss & pump damage | Medium | Engaged subject matter expert to carry out investigation and design | Bore investigation underway | New bores (~~and pump station~~) to replace Bore 1, 2, 3<br>- lower risk water<br>- closer proximity to Proserpine WTP<br>- Investigate open water intake as a supply option | 2022-23 | 2024-25 | Est $2.5M | Planning & Assets Engineer | 2018-Concept design completed<br>~~Pump Station complete, undergoing commissioning. Refer No. 29.~~<br>Planning for bores underway; ~~funding application in process for construction of 4 bores (1 bore funded)~~<br>Design phase underway on schedule; Capital works due for completion 23-24<br>Bore 10 redirected |
| **WTP** | **32** | Instrumentation Failure | Loss of online monitoring | Low | | | Replace Turbidity Analysers with HACH units as required. | | ~~June 2023~~<br>Dec 2023 | | Principal Engineer (Treatment) | ~~Due to unavailability of service technician (COVID lockdowns) will change to service provider with local technicians.~~<br>Cabinet and meters delivered, installation scheduled by June 23<br>Standardisation across region through WIM Alliance. |
| **Collinsville WTP** | **5** | Filtration Failure | Turbidity etc. | Low | | Turbidity Analysers at each Filter | Control system to have more control over plant | | Short Term<br>~~July 2018~~<br>Long Term<br>~~July 2019~~<br>~~Dec 2022~~<br>Dec 2023 | | Treatment Operations Manager<br>Principal Engineer (Treatment) | Initial-Analysers received 2018-Turbidity analysers installed. SCADA control scheduled for completion September 2019.<br>SCADA control delayed due to incorportion into Solar panel project with completion due end 2022.<br>Further delays due to absences of key staff.<br>Existing Radtel to stay with ClearScada overlays, there may be constraints on what can be done.<br>Secondary control completed on each filter to enable plant shutdown |
| **Collinsville WTP** | **33** | Electrical components failure - pump, power | Loss of Supply | | | Collinsville Solar Project | | Jun-22 | Dec 2023 | $900k | ~~Treatment Operations Manager~~<br>Capital Works Project Manager | Solar energy project to run both Collinsville WTP ~~and STP~~ with electrical upgrades at both plants, incorporating SCADA control, generator will be incorporated. No STP will be included at this stage.<br>Delayed due to absences of key staff (including Project Manager). ~~Initial project was simple, but has grown to include rewiring and existing transformer needs to be replaced (26 week wait)~~<br>Scope revised to fit within scope and existing funding. No rewiring etc.<br>In house project manager and superintendant employed to complete package of works. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Storage Reservoirs** | **20** | Human access to reservoirs | Bacterial, Viral and Protozoan contamination due to animal or human entry | High | Inspection of all reservoir roof structures, security and vermin proofing | Immediate minor repairs to identified issues where possible | Full asset check of all reservoir structures, vermin proofing material and site security, with asset list and mapping creation. Also preventative maintenance schedule created | Dec-15 | Ongoing | Staff time + what ever tasks are required. | Treatment Operations Manager & field staff, Network Operations Managers | Initial-Inspections complete. Roof repairs done. Monthly Reservoir inspections commenced.<br>Repairs to vermin proofing from cyclone Debbie required - Scheduled for October - December 2017.<br>2018-Ongoing<br>External audit of all reservoirs scheduled for 2019 (including safety and security). Report will feed into the database for scheduling of works required.<br>Inspections ongoing - Operators-water quality; Networks-structural/mechanical<br>External audit money used for maintenance and audit carried out by our own staff. Remaining findings included into maintenance schedule.<br>Repair works to commence on Mt Devlin reservoir. |
| **Security** | **31** | Cybersecurity | Breach into SCADA at WTPs or in Network | High | | CCTV & Boom gates at plants. External Audit of all sites | Implement audit actions | Short Term - end 2019; Long Term 2020 | Jun-24 | | Treatment Operations Manager; Network Operations Managers | 2018-CCTV & Boomgates installation commenced. External audit scope devised.<br>Site Safety - STP's completed.<br>Business case to be developed for high risk water sites (eg Proserpine WTP as is a multi use depot) for electronic gates.<br>Multiple locks are in use in some areas - to be removed.<br>CCTV not working consistently, footage not available.<br>Working with Facilities on CCTV<br>Slide gates preferable to boom gates<br>Cybersecurity - SCADA Strategy and 16 quick wins inititated. Ongoing.<br>Completed (initial items) |
| **Staff Training and Awareness** | **34** | Staffing | Insufficient staffing redundancy | High | Quality over Quantity | | Fully Trained operators for relief use at any site | | | | Treatment Operations Manager | No redundancy staff available for periods of absence. Collinsville WTP - only available backup has experience but no qualifications.<br>Replacement staff very difficult to get.<br>Only Trainee not filled.<br>Continuing with staff rotation program to enable staff multiskilling |
| **Storage Reservoirs** | **35** | Human access to reservoirs | Bacterial, Viral and Protozoan contamination due to animal or human entry | High | | | Repair works to reservoirs | Mt Devlin - June 2024<br>Bowen - June 2025<br>Cannonvale - June 2026<br>Shute Harbour- June 2025 | | | Capital Works Project Manager | Collinsville, Miller St - completed<br>Collinsville, Mt Devlin - RPEQ certified inspection identified additional works to meet regulations & specs. Works tendered to replace roof, vermin proofing and repairs up to required specs.<br>Bowen, 12ML - Reroofing, stair and roof access<br>Bowen, 3ML - Roof replacement, roof & stair access & leak detection and repair<br>Cannonvale - Structural inspection and subsequent repair, dependent on Cannon Valley reservoirs on line.<br>Shute Harbour (Mt Roper) - access fencing |
| **Collinsville WTP** | **4** | Contamination by Fresh Water Shellfish | Taste & Odour | Low | Shellfish removed as soon as observed. Regular inspections. Chlorination. | - PAC dosing initiated as required to remove taste and odour compounds | | | Ongoing | Operational cost as required | Operator | Initial-Ongoing maintenance; PAC dosing can be utilised to reduce taste and odour compounds<br>Ongoing<br>Complete Drain and clean of clarifier 2020 (travelling bridge also adjusted)<br>Maintenance ongoing |
| **Reticulation** | **6** | Chlorine Overdose | Taste / Odour | Low | Sodium hypochlorite dosing based on flow rate in WTP. Online chlorine analysers at plant have high chlorine CCP alarm that initiates plant shutdown. Daily sampling undertaken. | Telemetry to be installed to new online instrumentation within the reticulation. | Investigate effect of closing down re-chlorination stations & installation of more online analysers at strategic locations around the region. | Jun-19 | Jun-22 | $10K for telemetry on new analysers. | Treatment Operations Manager | Initial-Online chlorine residual analysers have been installed within the Bowen, Proserpine & Cannonvale reticulation.<br>Extra (Auto) sodium hypochlorite monitoring & dosing equipment installed at Bowen reservoir & Flemington rd chlorinator.<br>2018-Bowen reservoir completed. Flemington Rd chlorinator to be decommissioned.<br>Railway Rd (Merinda) dosing stations upgraded.<br>Telemetry for all analysers scheduled for 2021-22.<br>Southern reticulation network upgrade scheduled, See #29. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reticulation** | **7** | Chlorination failure / Loss of Residual / Chlorinator failure | Public health | High | Sodium hypochlorite dosing based on flow rate in WTP. Online chlorine analysers at plant have low chlorine CCP alarm that initiates plant shutdown. Daily sampling undertaken. | Telemetry to be installed to new online instrumentation within the reticulation. | Investigate effect of closing down re-chlorination stations & installation of more online analysers at strategic locations around the region. | Jul-19 | | $10K for telemetry on new analysers. | Treatment Operations Manager | As per No. 6 |
| **Reticulation** | **9** | Backflow | public health / Aesthetics | High | All RPZDs to be tested | RPZD testing schedule to be implemented with checks to ensure tests are completed in time. Faulty devices to be repaired or replaced. | Assets mapped and listed and annual preventative maintenance implemented into councils systems. Investigate if RPZ are present as part of meter assembly during | Nov-15 | Nov-19 | Staff time | Treatment Operations Manager, Trade Waste Coordinator, Network Operations Managers | Initial-Incomplete lists have been developed for Northern and Southern areas. Consolidating this role into a regional one through the trade waste coordinator.<br>2018-This role has moved back to Water Operations.<br>Audit completed, lists to be compiled into the new Council system.<br>Ongoing<br>Maintenance plan underway |
| **Reticulation** | **10** | High flow (sediments mobilised, slimes detached) | Aesthetics / Suspended Solids / Taste, Odour & Colour | Medium | Flushing program | Pigging program | Pigging program | | Ongoing | Staff time | Planning & Assets Engineer, Network Operations Managers | Initial-Pigging program underway<br>2018-Ongoing<br>Includes bore mains.<br>Ongoing |
| **Reticulation** | **11** | Slimes detaching | Aesthetics / Suspended Solids / Taste, Odour & Colour | Medium | Flushing program | Pigging program | Pigging program | | Ongoing | Staff time | Planning & Assets Engineer, Network Operations Managers | Initial-Pigging program underway<br>2018-Ongoing<br>Ongoing |
| **Bowen - Proserpine main** | **17** | Farmers over use of treated water | Water supply cut-off / Public health | High | Monitoring of usage and communication with farmers using WRWW treated water. | Future planning of use by farmers, with farmers | Farmers and state government to use alternatives to treated water. | tbc | Dec-16 | Staff time | Planning & Assets Engineer | Initial-Only 1 user allocation still in effect<br>2018-Monitoring on other potential users. |
| **Bowen - Proserpine main** | **18** | Farmers contaminating Drinking water supply | Public health | Medium | Communication with Farmers | Farmers to be asked to create SOPs for their usage of supply | Council to review farmers SOPs & processes for turning water on/off & usage. Also farmers to eventually use alternatives to treated drinking | tbc | Dec-16 | Staff time | Planning & Assets Engineer | Initial-Only 1 user allocation still in effect<br>2018-Monitoring on other potential users. |
| **Storage Reservoirs** | **21** | Animal Access to reservoirs. | Bacterial, Viral and Protozoan contamination due to animal or human | High | Inspection of all reservoir roof structures, security and vermin proofing | Immediate minor repairs to identified issues where possible | Full asset check of all reservoir structures, vermin proofing material and site security, with asset list and mapping creation. Also preventative maintenance schedule created & implemented | Dec-15 | Ongoing | Staff time + what ever tasks are required. | Treatment Operations Manager & field staff, Network Operations Managers | Initial-Inspections complete. Roof repairs done. Monthly Reservoir inspections commenced.<br>Repairs to vermin proofing from cyclone Debbi required - Scheduled for October - December 2017.<br>2018-Ongoing<br>Ongoing |
| **Storage Reservoirs** | **22** | Short circuiting of reservoirs | Bacterial, Viral, Protozoa | Medium | Reservoirs to be operated to ensure turnover (when network allows). | Possible pipework changes | Install mixers if appropriate. Installing sample taps at reservoirs to enable monthly sampling. | 2017-18 | Ongoing Monitoring | Staff time | Treatment Operations Manager. | Initial-Reservoirs appear to have appropriate mixing via operational level controls. Regular sampling to ensure residual maintained carried out each month.<br>2018-Ongoing<br>Ongoing |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Security** | **25** | Water quality | Water quality | High | | | In-depth Risk assessment and control measures to improve security at drinking water supply system sites and WTPs | Jun-16 | Ongoing | | Treatment Operations Manager, Network Operations Managers, Team Leaders | Initial-Risk assessments contained within DWQMP. Monthly Reservoir checks improve security on site.<br>2018-Ongoing<br>Ongoing |
| **Operation and Maintenance Procedures** | **26** | | | High | Draft set of procedures to be reviewed and updated. | Additional procedures required identified, drafted, reviewed and implemented | Regular review | Dec-15 | Ongoing | Staff time | Treatment Operations Manager; Network Operations Managers, Field Staff, Environmental Management Coordinator | Initial-A list of procedures (included in DWQMP) will be reviewed on 2 yearly basis. Further procedures identified in risk assessments will be developed as required.<br>2018-Ongoing<br>Ongoing |
| **Staff Training and Awareness** | **27** | Staff training and awareness | Staff training and awaren ess | High | | | Implement training and awareness workshops once management plan approved in toolbox talks. Assess training need through internal audits and general feedback. KPI toolbox talk, updated ADWG related toolbox talks | Dec-15 | Ongoing | Staff time | Treatment Operations Manager; Senior Staff, Field Staff, Environmental Management Coordinator | Initial-Gap analysis training conducted in September 2017 to certify operators under new national training package (NWP15). Refresher may be required for new staff, and new staff will also be updated under the new training package.<br>2018-Ongoing<br>Ongoing |
| **Customer Awareness Processes** | **28** | Customer awareness | Custom er awaren ess | Mediu m | | | Customer process definition and provide details to customer in customer service standards on levels of service they can expect. | Dec-15 | Ongoing | Staff time | Treatment Operations Manager; Environmental Management Coordinator, Website client liaison. | Initial-Complete. Updated standards uploaded onto Whitsunday Regional Councils website as required.<br>2018-Ongoing<br>Ongoing |
| **WTP** | **2** | Power failure | Loss of supply | High | Electrician to attend site | Generators to be installed at sites, see actions taken | Emergency Management Plan | Dec-16 | Dec 2019<br>June 2022 | Staff time | Operator; Senior staff | Initial-Generators to be installed at Foxdale bores, Coastal WTP, Bowen WTP<br>Generator at Proserpine booster<br>Solar Farm at Bowen WTP to supply plant & grid<br>2018-Generators installed at Foxdale bores, Dodd St bores, Coastal WTP, Bowen WTP.<br>Solar farm at Bowen WTP operational. Additional generators ordered for Proserpine WTP, Collinsville WTP, Proserpine high lift and a mobile unit.<br>Generators installed at Proserpine WTP, Proserpine High Lift pump and 3 x mobile units. Collinsville unit utilitsed on other project until Collinsville Solar Project underway See RMIP#33<br>Completed |
| **WTP** | **3** | Instrumentation Failure | Loss of online monitoring | Low | | Coastal WTP - Install new analysers at Clear Water Tank | Coastal WTP - upgrade PLC and control telemetry at bores | | Short Term<br>July 2018<br>Long Term<br>July 2019 | | Treatment Operations Manager | Initial-Analysers received 2018-Completed. Additional work - connecting all bores to SCADA<br>Completed |
| **Reticulation** | **29** | Chlorination failure / Loss of Residual / Chlorinator failure | Public health | High | Isolate Bore 10 from direct connection to potable water network (currently high pressure potable water going to bore) | Initiate Cannonvale Bulk Water Project. Purchase land for Cannon Valley Reservoir. Cannonvale Bulk Water porject - Cannonvale network configuration to isolate bulk supply from trunk and reticulation networks, to reduce pressure spikes in network and provide equal water age. | Deliver Cannonvale Bulk Water Project, build Cannon Valley reservoir and renew pipeline from Proserpine. | Short Term<br>2020-21<br><br>Long Term<br>2021-22 | | | Planning & Assets Engineer – Network Operations Managers COO. | 2018-Design complete.<br>Initial project implementation.<br>Bore 10 isolated from network and redirected to Proserpine WTP.<br>Reservoirs x 2 under construction, completion due June 2022<br>Network reconfiguration after construction completion.<br>June 2022 - Construction complete; Necessary reconfiguration complete. Not on-line as yet. More work required on program and timings for the works required at Coastal WTP.<br>Completed |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reticulation** | **8** | Main bursts / Repairs | Aesthetics / suspended solids / taste & odour | Medium | Monitor flow, reservoir levels, pressure, turbidity. Re-chlorination | Develop a mains burst / repair procedure. Training of operations staff on importance of Hygiene practices (Chlorination of lines following repair, chlorine test on reconnection) | Investigate best-practice chlorination of mains following a repair. | Dec-16 | Dec-17 | Staff time | Treatment Operations Manager, Network Operations Managers | 2018-Completed |
| **Reticulation** | **12** | Cross Contamination (close sewer proximity) | Bacterial, Viral, Protozoa | | | Develop a mains burst / repair procedure. Training of operations staff on importance of Hygiene practices (Chlorination of lines following repair, chlorine test on reconnection) | Investigate best-practice chlorination of mains following a repair. | | Dec-17 | Staff time | Treatment Operations Manager, Network Operations Managers | Initial-A chlorination of New mains procedure has been developed. A mains burst / repair procedure will be developed.<br>2018-Completed. See #8 |
| **Reticulation** | **13** | New main connections (contaminating existing system) | Aesthetics / Suspended Solids / Taste, Odour & Colour | | | Procedure for re-chlorination of new main prior to connection | | | Complete | | Treatment Operations Manager, Network Operations Managers | Initial-A chlorination of New mains procedure has been developed.<br>2018-Completed. See #8 |
| **Recycled Water** | **14** | Cross Connection to recycled water infrastructure | Bacterial, Viral, Protozoa | Low | | | RPZD's required and to be checked annually | Jun-17 | Jun-18 | Staff time | Treatment Operations Manager, Network Operations Managers, Team Leaders | Initial-Consolidating this role into a regional one through the trade waste coordinator.<br>2018-Completed. See #9 |
| **Bowen - Proserpine main** | **15** | Main break | Water supply cut off / public health | High | Adhoc repair | Visual check of line and valves. | Full asset check of all line and valves, with asset list and mapping creation. Also preventative maintenance schedule created | June-16 | Dec-17 | $40K | Planning & Assets Engineer | Initial-Line has been checked; Check valve being installed south of Whitsunday Shores (2/3 along main)<br>2018-Completed.<br>Included in maintenance program. |
| **Bowen - Proserpine main** | **16** | Sediment scouring / slime slough | Aesthetics / suspended solids / taste & odour | Medium | Turbidity monitors; lines flushed | Pigging to be undertaken to remove sediment build up | Pigging stations to be constructed | | Ongoing | $8K | Planning & Assets Engineer | Initial-All stations done, worst section of line has been pigged.<br>2018-Completed.<br>Included in maintenance program. |
| **Storage Reservoirs** | **19** | Pay out of under grade reservoirs. | Public health - Bacterial, Viral and Protozoan contamination | High | At-grade reservoirs have been isolated from system | Assessment of system storage to be completed to determine if at-grade reservoirs need to be on line. Additional sample points to be installed. | If reservoirs are required for satisfactory system operation, reconfiguration of valving to be carried out to ensure water | Dec-15 | Jul-18 | Staff time | Planning & Assets Engineer – Network Operations Managers COO. | Initial-Assessments complete. Bowen Res - work complete. Hydraulic modelling of Bowen Retic needs re-calibration for other reservoirs. Brisk Bay Res - scheduled for 2017-18<br>2018-Completed.<br>Brisk Bay Res off line until replacement scheduled for 2023-24 |
| **Security** | **23** | Terrorism, sabotage | Chemical / Biological | Medium | | Review of security at treatment plant sites to ensure access of unauthorised persons is adequately controlled | Preventative maintenance Schedule implemented in councils systems | Dec-15 | Dec-17 | Staff time | Treatment Operations Manager; Network Operations Managers | Initial-Monthly Reservoir checks have commenced. Action plans will be developed out of these to rectify issues. Emergency Management Plan<br>2018-Completed |
| **Security** | **24** | Natural Disasters | Cyclone, Earthquake, Flooding etc. | High | Emergency Management Plan | Emergency Management Plan | Emergency Management Plan | Jun-16 | Ongoing | Staff time | All Staff | Initial-Emergency Management Plan in effect. Developing a site based cyclone / wet-weather procedure.<br>2018-Completed |