DRINKING WATER QUALITY MANAGEMENT PLAN

ANNUAL REPORT

01/07/2021 – 30/06/2022

Presented by: Water and Waste Directorate
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INTRODUCTION

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

SECTION 2: OVERVIEW OF OPERATIONS

The approved DWQMP applies to eight drinking water supply schemes owned and operated by Isaac Regional Council - Carmila, Clermont, Dysart, Glenden, Middlemount, Moranbah, Nebo, and St Lawrence. An overview of the treatment processes and capacities of each water supply system is listed below.

CARMILA

Raw water is extracted from 2 shallow bores adjacent to Carmila Creek and pumped to the Water Treatment Plant (WTP) inlet where it is treated using the following treatment process:

- Coagulation with alum.
- Calcium hypochlorite dosing for iron and manganese oxidation and sufficient residual for final disinfection; (Sodium hypochlorite could also be used)
- Polymer dosing as a flocculation aid.
- Flocculation.
- Clarification.
- Media filtration.

Carmila WTP operates at normal capacity of 1.5 L/s but can run at up to 3 L/s if required. The start-up and shutdown of the treatment plant is automatic, based on pre-set levels in the treated water reservoir.

CLERMONT

Raw water is extracted from the Theresa Creek Dam and pumped to a balance reservoir, then gravity feeds to a 2 ML raw water reservoir. The water then gravity feeds to the WTP inlet where it is treated using the following treatment process:

- Pre-chlorine gas dosing for manganese oxidation (optional, alternate chemical to potassium permanganate)
- pH correction with sodium hydroxide (when required)
- PAC dosing for algae, taste and odour removal (when required) – can also be dosed on the outlet of the raw water tank and/or clarifier for process flexibility
- Potassium permanganate dosing used for metals and organics oxidation (when required, preferred method of oxidation)
- Coagulation with Aluminium Chlorohydrate (ACH)
- Polymer dosing for flocculation aid (when required)
- Flocculation
- Clarification
- Media filtration
- pH correction with sodium hydroxide (when required)
- Disinfection with chlorine gas

- Trim chlorine gas dosing to maintain a residual in the reticulation.

Clermont WTP operates at normal capacity of 65 L/s but can run at up to 80 L/s if required.

Operation of the WTP starts and stops based on pre-set levels in the treated water reservoir.

DYSART

Raw water is extracted from the Mackenzie River and pumped to BMA's Turkeys Nest Dam located adjacent to the southwest corner of the WTP site. Water is pumped on demand from the Turkey's Nest Dam to the new raw water storage tank from where it is treated using the following treatment process:

- ACH dosing before entering DAF unit
- Flocculation
- Dissolved Air Floatation (DAF) to remove Algae and other organics
- Pre-pH correction with sodium hydroxide or hydrochloric acid when required
- Potassium permanganate dosing for oxidation of metals (preferred method of oxidation)
- Chlorine gas dosing for oxidation of metals (alternative oxidant)
- PAC dosing for taste and odour removal
- Coagulation with ACH
- Polymer dosing for flocculation aid
- Flocculation
- Clarification
- Pre-filter chlorination for residual metals removal in the filters by coated media process
- Media filtration
- Granular Activated Carbon (GAC) filtration (for the removal of trihalomethanes, residual odour and taste); and
- Disinfection with chlorine gas.

Dysart WTP typically operates at 60 L/s, with a capacity of 90 L/s but can run at up to 100 L/s if required for short periods. The WTP is operated to minimise the number of starts/stops by controlling raw water influent flows based on levels in the treated water reservoirs.

GLENDEN

Raw water is extracted from the Bowen River Weir, stored in 100 ML Mine Dam and pumped to the WTP inlet where it is treated using the following treatment process:

- PAC dosing for removal of tastes and odours (when required)
- Coagulation with aluminium sulphate
- Polymer dosing for flocculation aid (when required)
- Flocculation
- Clarification
- Media filtration
- Post-pH adjustment with sodium hydroxide; and
- Disinfection with sodium hypochlorite.

Glenden WTP operates at normal capacity of 60 L/s but can run at up to 80 L/s if required. The WTP typically operates depending on levels in the treated water reservoir.

MIDDLEMOUNT

Raw water is extracted from the Mackenzie Weir, pumped to Bingegang Dam and then on to the raw water turkey's nest dam on site at Middlemount WTP. It is treated using the following treatment process:

- Potassium permanganate dosing used for metals and organics oxidation (when required)
- PAC dosing prior to the flash mixer, clarifier and/or filter inlets (when necessary)
- Chlorine gas dosing for iron and manganese oxidation (optional, alternate chemical to potassium permanganate)
- Coagulation with All Clear 345 (ACH or Nalco Ultrion 44560 can be used as chemical alternatives if required)
- Flocculation
- Clarification
- Pre-filter chlorination for residual metals removal in the filters by a coated media process
- Media filtration
- Disinfection with chlorine gas.
- Post-pH correction with sodium hydroxide (if required)

Middlemount WTP operates at normal capacity of 60 L/s but can run at up to 90 L/s if required and starts and stops based on pre-set levels in the Treated Water Reservoir.

MORANBAH

There are two separate process trains at Moranbah – Boby WTP and the Main WTP

Raw water is extracted from the Burdekin Dam (occasionally also from Eungella Dam and potentially from the Braeside Bore field) and pumped to the WTP inlet where it is treated using the following treatment process:

- Pre-pH adjustment with Sodium Hydroxide (When required)
- Pre-chlorine gas for iron and manganese oxidation
- PAC for taste and odour removal
- Coagulation with ACH
- Polymer dosing for flocculation aid (Main WTP only)
- Flocculation
- Clarification
- Media filtration
- Sodium Hydroxide dosing for pH adjustment
- Disinfection with chlorine gas
- Fluoridation with sodium fluoride.

Moranbah has a combined capacity of 180 L/s, the Boby Plant processing up to 60 L/s and the Main WTP processing 120 L/s. These WTPs can operate individually or simultaneously, according to the level in the

Treated Water Storage reservoirs. The Boby Plant is rarely used but is available during high demand periods and when the main WTP train is offline for maintenance.

NEBO

Raw water is currently pumped from one of two bore trains available. The bore train configuration manages extraction allocations and water quality characteristics for treatment, specifically hardness and metal (iron and manganese) concentrations, through blending ratios.

Bore water is treated by the following processes:

- Pre-chlorine dosing for metals oxidation, if required
- Media filtration
- Ion exchange for softening using sodium chloride for regeneration
- Sodium hydroxide for pH correction
- UV Disinfection
- Chlorine gas dosing for disinfection residual and additional trim dosing

Bore Group 1 consists of Bores 2, 4 and 6 and Bores 3, 5 and 7 make up Group 2. The current total annual allocation of water from the bores is 250 ML/year. Bores 2 and 3 have an allocation of 75 ML/year, bores 4 and 5 also have an allocation of 75 ML/year and bores 6 and 7 have an allocation of 100 ML/year.

Nebo WTP is rated for up to 25 L/s, but actual flowrates are dependent on the bores in use and system demand. Bores 2, 3, 4, 6 and 7 have a pump rate of 8 L/s each and are linked to the Nebo Creek Aquifer. Bore 5 has an approved pump rate of 6 L/s.

ST LAWRENCE

Raw water is extracted from St Lawrence Creek and pumped to the WTP inlet where it is treated using the following treatment process:

- Pre-pH correction with soda ash
- Oxidation of iron, manganese and organics with potassium permanganate (or calcium hypochlorite)
- Coagulation with aluminium sulphate
- Flocculation
- Clarification
- PAC dosing for removal of tastes and odours (when required);
- Media filtration; and
- Calcium hypochlorite dosing for final disinfection

St Lawrence WTP operates at normal capacity of 2 L/s but can run at up to 3.4 L/s and starts and stops based on the level in the treated water reservoir.

SECTION 3: ACTIONS TAKEN TO IMPLEMENT THE DWQMP

PROGRESS IN IMPLEMENTING THE RISK MANAGEMENT IMPROVEMENT PROGRAM

Council's Risk Management Improvement Program (RMIP) is aimed at implementing improvements and minimising risks in the provision of reliable and safe drinking water. Actions captured in the RMIP may originate from the following sources:

- Risk Assessments
- DWQMP reviews and audits
- Drinking water incidents
- Regulator feedback
- General Improvements.

The Improvement Program with status updates is included in Appendix A. Progress has been made across all water schemes to meet the requirements of the DWQMP, some improvement items are delayed due to priority and budgetary constraints. A summary of completed actions and actions in progress are detailed below.

IMPROVEMENTS COMPLETED IN THE 2021-22 REPORTING YEAR

- A review of the Isaac Regional Council (IRC) Drinking Water Incident Management System was completed as required by the conditional approval the IRC DWQMP (Rev H).
- The drinking water reservoir at Carmila has been cleaned and repairs undertaken to enclose the vessel in response to E.coli detections
- Bench top analysers for iron and manganese have been reviewed in response to exceedances at Clermont and St Lawrence. Trials have been carried out on two bench top analysers using raw water sourced from all schemes and process and treated water from Moranbah WTP. Based on the trial, Hach DR3900 benchtop analysers have been ordered for use across six schemes.
- The manganese test method has been reviewed in response to exceedances at Clermont and St Lawrence. Preliminary trials showed the Merck test method to be accurate and reliable. More comprehensive testing also yielded positive outcomes and the Merck test method will replace the palintest and the cyanide test methods across six schemes.
- Externally audited re-certification was achieved in May 2022 whereby the directorate was noted as complying to the International Standards for Safety (ISO 45001:2018), Environment (ISO 14001:2015) and Quality (ISO 9001:2015).
- The Integrated Management System that manages procedures, work instructions and check lists relating to drinking water schemes has been audited with actions in progress.
- Implementation of the Integrated Management System (encompassing quality, environment and health and safety) has continued. This has improved document management and is assisting with issues arising from staff turnover.
- A contract for air compressor maintenance has been awarded to fulfill periodic maintenance and breakdown response to ensure continuity in treated water supply to communities.
- Middlemount WTP clearwater tanks 1 & 2 repairs have been completed to address corrosion and prevent contaminant ingress.
- Water mains in Clermont along Lime and East Streets have been upgraded to a 150mm diameter water ring main, thus improving water supply pressure & firefighting requirements.
- Dilapidated and failed valves and fire hydrants in the water network have been replaced or upgraded to ensure the minimum fire-fighting water pressure and flow requirements are met, particularly in Clermont.
- Potable water meters have been installed on unmetered properties and parks, to take steps to reduce water consumption and identify leaks and suspect water usage.

- Old bulk water meters have been replaced to ensure accurate reading and recording which is critical to the cost to council (rate payers) for the purchase, treatment, and distribution of potable water. This project also adds taggles to these water meters will allow usage data to be capture, which assist in future leaking detection and water balancing.
- Clermont WTP Quality Response Action Works – online analysers have been installed for the measurement of total manganese and total iron in raw water, treated water and towns water.
- Replacement of old failed equipment at water treatment plants including 4 bench top spectrophotometers, installation of 2 air compressors, 2 x Grundfos Pumps, 5 x portable field UVT/UVA analysers, VN spartan camera inspection

IMPROVEMENTS CURRENTLY IN PROGRESS

The following improvement actions are currently in progress or are expected to commence during 2022/2023 (with some to be carried over to 2023-2024)

- The trial for the recording of Operational Monitoring onto SWIMS has progressed to data entry via a tablet.
- A structured risk assessment for the Nebo drinking water scheme commenced (completed September 2022).
- Implement actions and improvements identified during the Audit, including the simplification of the Risk Management Improvement Program.
- Recruitment has continued to fill roles identified through the Council Water and Waste Directorate functional review and subsequent review.
  - The Maintenance Planner will coordinate the scheduling of periodic maintenance across all water schemes and will enhance the response in addressing issues relating to quality and continuity of supply.
  - The Dams Technical Officer will coordinate Dam improvement projects that contribute to raw water quality and supply.
  - The Compliance & IMS Coordinator and Compliance & IMS Officer will ensure continuous improvement in relation to the ongoing maintenance of our Integrated Management System as well as regulatory compliance reporting and management.
- Implementation of improvements identified through the incident investigations as detailed in the preventative measures in Table 3.
- Moranbah WTP Roof Replacement – Replace the corroding roof and purlins of the water storage tank 1 at Moranbah WTP along with addressing other areas of tank corrosion.
- Moranbah WTP Boby Plant Filter Media Replacement - Replacement of filter media and filter nozzles. Epoxy coat internal walls of filter units to protect against corrosion.
- Theresa Creek Dam Riparian Valve – Repair of the riparian value at Theresa Creek Dam to allow a riparian release of water for downstream benefit.
- Theresa Creek Dam Floating Offtake Structure - Install a floating raw water off-take at Theresa Creek Dam to withdraw water from higher levels within the dam.
- Moranbah 400 ML Raw Water Dam Remediation works – Repair the dam wall to ensure full utilisation of this storage facility and prolong its life.
- Clermont Water Network Augmentation – Upgrade the pipeline network improvements in the northern area of Clermont to address low pressure areas and allow for growth.

- CORP Cathodic Protection Water – Repair and install Cathodic Protection (CP) on steel assets to reduce corrosion of steel assets, e.g., water reservoirs.
- Nebo Water Network Augmentation – Install additional water mains in six locations to provide network loops and extra capacity, which improves water pressure and quality. Also install a non-return on the WTP side of the elevated water storage tower to offer protection against water loss during water feed pipe breakage.
- SCADA Upgrades – Upgrade the control systems at the treatment plants and pump stations to improve monitoring and control along with providing consistency and functionary across the network. This project is to be staged over multiple years to cover the whole region and will include equipment, computer/network hardware and software.
- WTP Old Failed Equipment – Undertake like for like replacement of equipment when it fails or been identified as ready to fail.
- Moranbah WTP Filter Valve Replacement – Replacement of the 45 valves and actuators. The project also consolidates the pneumatic air tubing to a single ring-main system and upgrade the electronic control system to include the operation of the new components and integrated into the SCADA system to allow automation.
- St Lawrence Water Storage and Raw Water Main - Install 1.2 km of water mains from the east side of Bruce highway to the weir dam pump station and install new raw water reservoir beside the treatment plant. This is to address water security by replacing an old pipe with a recent history of failing and addition water storage.
- Middlemount WTP to Reservoir Mains – Ensure chlorine levels are retained at Middlemount caused by lack of water cycling through the 8ML reservoir.
- Lab Equipment – Replace existing lab equipment used for testing water where the equipment condition and age are affecting the accuracy and range of the tests.
- Clermont Filter Media and Plant Modernisation – Replace the filters media at Clermont WTP as they are due for replacement. Also modernise the plant's control systems including connecting all sensors to the control system and upgrading to SCADA system to the same standard as the other plants.

REVISIONS MADE TO THE VERIFICATION MONITORING PROGRAM

IRC periodically conducts a review of the verification monitoring program and testing conducted by Mackay Regional Council Laboratory to ensure it is appropriate for the magnitude of the scheme and the risks identified. The verification monitoring program was last reviewed in July 2020 and has been followed for this reporting period. The *E. coli* monitoring at Carmila network was increased for a duration of four months in response to an incident.

REVISIONS MADE TO THE OPERATIONAL MONITORING PROGRAM

The operational monitoring program has remained unchanged although the range of tests and test methods have been improved. The frequency of monitoring increased beyond the operational monitoring program requirement in response to an incident or event. The risk management improvement plan includes actions to transition to online monitoring of critical control points where automation allows. The operational monitoring program will be reviewed in 2023.

SECTION 4: COMPLIANCE WITH WATER QUALITY CRITERIA

Detailed summaries of each supply system's verification monitoring and *E. coli* compliance with water quality criteria are included in Appendix B.

Algal toxin analysis was carried out only when the total cell counts for toxin producing algae (Cyanobacteria) exceeds 500 cells/mL, as per IRC Blue Green Algae Management Plan (BGAMP).

Annual testing of inorganics has been undertaken for all systems. At least one sample has been recorded in the year's data as per the verification monitoring plan.

IRC periodically conducts review of the verification monitoring program for testing conducted by Mackay Regional Council Laboratory to ensure it is appropriate for the raw water sources used and to minimise any unnecessary testing. The revised verification monitoring program implemented following the DWQMP update approved in May 2020 has been followed for this reporting period.

Table 1: Drinking Water Quality Summary

	Health	Aesthetic	IRC DWQMP	Reticulation	*E. coli*	Not measured
CARMILA	0	7x Al 3x Fe 1x pH 9x DO (low)	0	3x Chlorine Residual (low)	5	0
CLERMONT	0	1x Al 1x Mn 3x DO (low)	1x Filtered Water Turbidity 3x Treated Water Turbidity 2x Pesticides	1x Turbidity	0	
DYSART	0	3x Al 3x DO (low)	0	0	0	Turbidity (5 January and 29 June)
GLENDEN	0	1x DO (low)	0	0	0	Weekly Parameters (5 May)
MIDDLEMOUNT	0	1x DO (low)	0	5x Chlorine Residual (low)	0	Pesticides and Hydrogen Sulphide (March)
MORANBAH	0	0	1x Pesticides	0	0	Pesticides (March)
NEBO	0	50x Hardness 22x TDS 1x DO (low)	0	0	0	
ST LAWRENCE	4x Mn	4x Al 12x Mn 3x DO (low)	1x Turbidity	4x Chlorine Residual (low)	0	

Carmila:

- *E. coli* detections detailed below

Clermont: No ADWG health exceedance

- On 1/12/2021, 21/12/2021 and 23/03/2022 the turbidity was reported to be 1.2 NTU, 2.4 NTU and 1.45 NTU respectively, against the IRC DWQMP CCP of 1 NTU
- Tebuthiuron (pesticide) was detected twice, 2/02/2022 and 1/06/2022. There is no ADWG limit for this species and no other pesticides were detected during this period.

Dysart: No ADWG health exceedance

Glenden: No ADWG health exceedance

Middlemount: No ADWG health exceedance

Moranbah: No ADWG health exceedance

- 2-methylnaphthalene (pesticide) was detected once on 2/03/2022. There is no ADWG limit for this species and no other pesticides were detected during this period.

Nebo: No ADWG health exceedance

St Lawrence:

- Total manganese concentrations exceeded the ADWG health guideline value on four occasions – 21/12/2021 (0.833 mg/L), 29/12/2021 (1.298 mg/L), 20/04/2022 (0.572 mg/L) and 27/04/2022 (1.012 mg/L)
- On 18/05/2022 turbidity was reported to be 1.2 NTU against the IRC DWQMP CCP of 1 NTU

Additionally, no treated water sampling was undertaken between January and mid-April as the St Lawrence WTP was offline due to raw water quality during that period.

E. coli

E. coli was detected in the Carmila reticulation on 5 occasions:

- 6.4 MPN/100 mL, 21st December 2021, Music Street
- 5.3 MPN/100 mL, 23rd February 2022, Music Street
- 3.1 MPN/100 mL, 24th February 2022, Council Depot
- 2.0 MPN/100 mL, 13th April 2022, Network East Sample Point
- 1.0 MPN/100 mL, 14th April 2022, Network West Sample Point

Complete summaries for *E. coli* compliance for all schemes are included in Appendix B.

SECTION 5: NOTIFICATIONS TO THE REGULATOR

There were eleven events or exceedances reported to the Regulator across eight IRC schemes. These notifications related to the temporary use of alternative drinking water supply, exceedances relating to the IRC DWQMP limits or ADWG health limits. These exceedances are summarised in Table 2. The six exceedances reported to the Regulator in the 2020-21 reporting year and the eleven exceedances reported to the Regulator in the 2021-22 reporting year have been formally closed. There are currently no open events or incidents.

Table 2: Summary of Notification

INCIDENT DATE	SCHEME	LOCATION	PARAMETER	DESCRIPTION OF EVENT	IMPROVEMENT
1/12/2021	Clermont	Treated Water	Turbidity (1.2 NTU)	Treated water turbidity was measured at 1.2 NTU against a limit in IRC DWQMP of 1 NTU	Internal reporting Configuration of automated breach emails
8/12/2021	Carmila	Network	Free chlorine (0.11 mg/L)	A network sample in Carmila measured less than 0.2 mg/L free chlorine, the lower limit nominated within IRC DWQMP.	Internal reporting Configuration of automated breach emails
8/12/2021	St Lawrence	Network	Free chlorine (0.12 mg/L)	A network sample in St Lawrence measured less than 0.2 mg/L free chlorine, the lower limit nominated within IRC DWQMP.	Internal reporting Configuration of automated breach emails
15/12/2021	Carmila	Network	Free chlorine (0.1 mg/L)	A network sample in Carmila measured less than 0.2 mg/L free chlorine, the lower limit nominated within IRC DWQMP.	Internal reporting Configuration of automated breach emails
15/12/2021	St Lawrence	Network	Free chlorine (0.14 mg/L)	A network sample in St Lawrence measured less than 0.2 mg/L free chlorine, the lower limit nominated within IRC DWQMP.	Internal reporting Configuration of automated breach emails
19/12/2021	Clermont	Network	Turbidity (18 NTU)	An increase in raw water manganese and iron was not detected. And investigation highlighted the test method utilised at the time did not identify elevated residual manganese and iron in settled water that subsequently precipitated during a pH increase at disinfection to form the discoloration and elevated turbidity.	Change in coagulant and oxidising agent. Change in order of dosing for pH correction. Revised operational setpoints and quality testing equipment and reagents. Capital improvements planned for filter media, online turbidity meters and chemical dosing.

INCIDENT DATE	SCHEME	LOCATION	PARAMETER	DESCRIPTION OF EVENT	IMPROVEMENT
21/12/2021	Carmila	Network	*E. coli* (6 MPN/100 ml)	There was a decrease in the use of drinking water which increased storage time and reduced the free chlorine below the recommended minimum threshold to maintain an effective disinfection residual.	Maintain a residual of > 0.2 mg/L in the network and reduce storage volumes for holiday periods.
21/12/2021	St Lawrence	Treated water	Manganese (0.833 mg/L)	An increase in raw water manganese was not detected. An investigation highlighted the test method utilised at the time did not identify elevated residual manganese. Subsequently the raw water was determined to be too variable for the water treatment plant capability	Drinking water was brought in via tanker, supplied into the treated water reservoir
21/12/2021	St Lawrence	Network	Free chlorine (0.09 mg/L)	A network sample in St Lawrence measured less than 0.2 mg/L free chlorine, the lower limit nominated within IRC DWQMP.	Internal reporting Configuration of automated breach emails
29/12/2021	St Lawrence	Network	Free chlorine (0.15 mg/L)	A network sample in St Lawrence measured less than 0.2 mg/L free chlorine, the lower limit nominated within IRC DWQMP.	Internal reporting Configuration of automated breach emails
05/01/2022	Middlemount	Network (all 5 sample locations except the Football Fields)	Free chlorine (0.04 mg/L)	A network sample in Middlemount measured less than 0.2 mg/L free chlorine, the lower limit nominated within IRC DWQMP.	Short term: shorter run length, reduce water store in the treated water reservoir, daily testing and flushing where required. Medium term: capital installation of in-tank dosing and mixing
23/02/2022	Carmila	Treated water	*E. coli* (5.3 MPN/100 ml)	The calcium hypochlorite pump failed. Visual inspection indicated the treated water reservoir hatch could be blown open strong winds with the potential for ingress of contaminants.	Replaced failed chlorine dosing pump with spare. Purchase a new spare. The hatch was secured.
15/03/2022	Clermont	Filtered water	Turbidity (0.56 NTU)	On review of the treatment plant log sheets, the filtered water was noted to be higher than the critical limit and not reported internally. The filter was backwashed and returned to service with follow-up checks carried out but not recorded	Improve reporting of breaching critical limits and recording of follow-up quality testing. Capital improvements planned for filter media and online turbidity meters with automatic shutdown.

INCIDENT DATE	SCHEME	LOCATION	PARAMETER	DESCRIPTION OF EVENT	IMPROVEMENT
23/03/2022	Clermont	Treated water	Turbidity (1.45 NTU)	Treated water turbidity was measured at 1.45 NTU against a limit in IRC DWQMP of 1 NTU	Internal reporting Configuration of automated breach emails
30/03/2022	Moranbah	Raw water	Cyanobacteria (0.6 mm^3/L)	Cyanobacteria in raw water was detected with a biovolume of 0.8845 mm^3/L against the IRC BG Algae Management Plan of 0.6 mm^3/L for Alert level 2. Preventative measures were implemented in the treatment process and weekly testing showed there was no impact to the treated water during this period.	Short term: Reduce throughput and increased powdered activated carbon dosing. Medium term: Assess improvements to the catchment and raw water storage reservoirs. Capital improvements planned for filter media and online turbidity meters in Moranbah WTP. Update Blue-Green Algae Management Plan
13/04/2022	Carmila	Network	*E. coli* (1 MPN/100 ml)	*E. coli* was detected in the network. A visual inspection identified the potential for ingress into the treated water reservoir through gaps between the wall and roof.	Treated water reservoir cleaned and repairs taken to eliminate ingress potential. Capital improvements planned for online analyser for chlorine measurement with automated shutdown. Scouring of the network pipelines is scheduled for 2023.
20/04/2022	St Lawrence	Treated water	Manganese (0.572 mg/L)	There was an increase in raw water manganese and the potassium permanganate dosing was not increased adequately. A calculation tool for the minimum potassium permanganate dose was introduced.	The flowrate was decreased, and the potassium permanganate solution was reduced to 0.5% to improve the reaction. Capital improvements planned for filter media, online turbidity meters and chemical dosing.
10/05/2022	St Lawrence	Raw water	Pipe break	The raw water supply pipe to the treatment plants failed and access for repairs was not possible for an extended period due to the wet ground.	Drinking water was brought in via tanker, supplied into the treated water reservoir. Capital improvements will replace the raw water supply line.
18/05/2022	St Lawrence	Treated Water	Turbidity (1.2 NTU)	Treated water turbidity was measured at 1.2 NTU against a limit in IRC DWQMP of 1 NTU	Internal reporting Configuration of automated breach emails
26/06/2022	St Lawrence	Network	Turbidity (83.9 NTU)	Elevated chlorine in the treated water mobilised manganese in the network pipes. The network was flushed, and chlorine returned to target limits	Operational awareness of upper limits of CCPs. Capital improvements planned for online analyser for chlorine measurement with automated shutdown. Scouring of the network pipelines has been scheduled for 2023.

SECTION 6: CUSTOMER COMPLAINTS RELATED TO WATER QUALITY

Table 3 outlines the water quality complaints reported by consumers in the 2021-2022 reporting year. Complaints increased in the 2021-2022 compared with the previous year. The majority of complaints for the current reporting year related to discoloured water at Clermont occurring in late December. Overall, 63% of the complaints related to water quality followed by 34% relating to discoloured water.

On 23 January 2022, complaints were received from four Moranbah customers over three days regarding taste and odour. Additional network samples were taken and these detected MIB at 32 ng/L and 39 ng/L. Powdered activated carbon was used in the treatment process. Subsequent samples showed no detection of MIB or Geosmin.

Table 3: Summary of Water Quality Complaints

	Health Concern	Discoloured Water	Taste	Odour	Quality	Total
CARMILA	0	0	1	0	0	**1**
CLERMONT	0	32	0	0	65	**97**
DYSART	0	1	0	0	0	**1**
GLENDEN	0	0	0	0	2	**2**
MIDDLEMOUNT	0	1	0	0	0	**1**
MORANBAH	0	5	4	0	5	**14**
NEBO	0	1	0	0	2	**3**
ST LAWRENCE	0	4	0	0	8	**12**
TOTAL	**0**	**44**	**5**	**0**	**82**	**131**

HEALTH CONCERN

Customers who suspect their water may be of a health concern can contact Isaac Regional Council on 1300 ISAACS. This concern will be further investigated with respect to water quality, typically by testing the closest reticulation sampling point.

During 2021/22 there were no confirmed cases of illness arising from the water supply system.

AESTHETIC COMPLAINTS

When water quality complaints are received, the following standard responses are performed as appropriate. Between each action, the water is sampled to determine whether the situation has been rectified.

1. Localised flushing.
2. Mains flushing.
3. Samples collected for further investigation (if required, particularly if the cause of the complaint is unknown).

DISCOLOURED WATER

When a complaint is received that relates to discoloured drinking water, the following investigations are conducted, and corrective action taken:

a. Conduct sampling and testing of the affected water

b. Review treatment processes and chemical dosing systems.

c. Drain the vessels in treatment plant if contamination is suspected.

d. Undertake flushing of network mains

e. Take corrective actions and monitor water quality at a higher frequency.

f. Continue to monitor water quality at a higher frequency for at least seven days after the incident has been resolved.

TASTE AND ODOURS

The taste and odour complaints can be related to the taste of chlorine in the water supply. During testing, staff explain to customers the importance of free chlorine in drinking water.

Where there are complaints of an earthy taste or odour, samples are collected and tested for MIB and Geosmin. Treated water samples are tested on a monthly basis for MIB and Geosmin as part of the verification monitoring program.

SECTION 7: OUTCOME OF THE REVIEW OF THE DWQMP

A review of the IRC DWQMP was completed in 2021. Minor amendments were identified, and these were reported to the Regulator in December 2021 as version H of the DWQMP.

On the 22 March the Regulator issued a Notice of Decision approving the Plan with conditions.

SECTION 8: FINDINGS AND RECOMMENDATINS OF THE DWQMP AUDITOR

The audit of IRC DWQMP will be completed in the 2022-23 drinking water year

APPENDIX A: IMPLEMENTATION OF THE DWQMP IMPROVEMENT PROGRAM

Refer to a separate spreadsheet.

APPENDIX B SUMMARY OF COMPLIANCE WITH WATER QUALITY CRITERIA

All testing results were obtained via the Mackay NATA accredited Laboratory, with the exception of daily free chlorine residuals which were obtained from operational plant monitoring data. Health and aesthetic exceedances are highlighted.

CARMILA SUPPLY SYSTEM

Carmila Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	52	52	7 (Aesthetic)	26.26	32.65	114.06	396.57	664.00	5.00
Conductivity	µS/cm		52	52	0	169.0	289.1	344.6	400.3	425.0	None
E. coli	MPN/100mL		59	0	0	<1	<1	<1	<1	<1	1.00
Iron	µg/L		52	52	3 (Aesthetic)	<2	14.63	92.82	251.18	710.00	2.00
Manganese	µg/L		52	52	0	1.8048	2.148	11.68	35.03	80.00	None
pH			60	60	1 (Aesthetic)	6.95	6.95	7.30	7.80	9.10	None
Residual Chlorine	mg/L		60	60	0	0.68	1.24	2.19	3.21	3.80	None
Total Dissolved Solids (TDS)	mg/L		52	52	0	101.0	173.6	206.8	240.3	255.0	None
Turbidity	NTU		55	46	0	<0.1	<0.1	0.19	0.42	0.85	0.1
Alkalinity	mg/L	Monthly	12	12	0	74.6	82.8	114.4	188.9	278.5	None
Bromate	µg/L		12	0	0	<20	<20	<20	<20	<20	20
Calcium	mg/L		12	12	0	21.024	21.270	25.441	30.126	32.097	None
Chlorate	µg/L		12	12	0	46.01	60.32	207.66	522.15	788.89	None
Chlorite	µg/L		12	0	0	<20	<20	<20	<20	<20	20
Dissolved Oxygen	% Sat		12	12	9 (Aesthetic)	51.3	55.6	74.9	96.1	98.3	None
Fluoride	mg/L		12	1	0	<0.1	<0.1	<0.1	<0.1	0.133	0.1
Magnesium	mg/L		12	12	0	8.43	8.71	10.47	12.21	12.55	None
Nitrate	mg/L		12	4	0	<0.3	<0.3	0.356	0.753	0.877	0.3
Nitrite	mg/L		12	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.4
Residual Alkalinity	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Temporary Hardness	mg/L		12	12	0	74.6	82.7	114.4	188.9	278.5	None

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
THMs	µg/L		12	12	0	39.1	47.8	84.2	120.8	123.0	None
Total Hardness	mg/L		12	12	0	88	89	107	126	132	None
True Colour	TCU		12	6	0	<1	<1	1.27	2.45	3	1
Ammonia	mg/L	Quarterly	4	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic	µg/L		4	0	0	<1	<1	<1	<1	<1	1
Cadmium	µg/L		4	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Chromium	µg/L		4	4	0	0.142	0.1546	0.21	0.24	0.24	None
Copper	µg/L		4	0	0	<1	<1	<1	<1	<1	1
Formaldehyde	mg/L		6	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Hydrogen Sulphide	mg/L		4	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Mercury*	µg/L		4	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Pesticides	µg/L		4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Selenium	µg/L		4	0	0	<5	<5	<5	<5	<5	5
Zinc	µg/L		4	4	0	1.21	1.22	1.85	3.24	3.58	None
Barium	µg/L	Annually	1	1	0	23.62	23.62	23.62	23.62	23.62	None
Beryllium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Boron	µg/L		1	1	0	15.73	15.73	15.73	15.73	15.73	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20
Molybdenum	µg/L		1	1	0	2.86	2.86	2.86	2.86	2.86	None
Radionuclides - Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Radionuclides - Gross beta	Bq/L		2	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Silver	µg/L		1	1	0	0.16	0.16	0.16	0.16	0.16	None
Tin	µg/L		1	1	0	11.30	11.30	11.30	11.30	11.30	None
Uranium	µg/L		1	1	0	1.79	1.79	1.79	1.79	1.79	None

* The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.

Carmila Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: Carmila Network 6 Music St (Jul 2021 - Jun 2022)										
pH	-	37	37	0	7.20	7.20	7.61	7.80	7.90	None
Free Chlorine	mg/L	37	37	3* (Health)	0.10	0.11	0.34	0.79	1.06	None
E. coli	MPN/100mL	37	2	2 (Health)	<1	<1	<1	1.63	6.40	<1
Sample Location: Carmila Network Council Depot garden tap (Jul 2021 - Jun 2022)										
pH	-	2	10	0	7.30	7.31	7.38	7.44	7.45	None
Free Chlorine	mg/L	2	10	0	0.37	0.39	0.55	0.71	0.73	None
E. *coli*	MPN/100mL	2	1	1 (Health)	<1	<1	1.90	2.98	3.10	1
Sample Location: Carmila Network East (Jul 2021 - Jun 2022)										
pH	-	23	13	0	7.40	7.41	7.57	7.69	7.70	None
Free Chlorine	mg/L	23	13	0	0.60	0.68	1.05	1.49	1.50	None
E. *coli*	MPN/100mL	23	1	1 (Health)	<1	<1	<1	<1	2.00	1
Sample Location: Carmila Network Lab Sink (Jul 2021 - Jun 2022)										
pH	-	4	3	0	7.60	7.60	7.61	7.64	7.65	None
Free Chlorine	mg/L	4	3	0	0.47	0.47	0.67	0.96	1.01	None
E. *coli*	MPN/100mL	4	0	0	<1	<1	<1	<1	<1	1
Sample Location: Carmila Network West (Jul 2021 - Jun 2022)										
pH	-	21	10	0	7.40	7.50	7.58	7.65	7.70	None
Free Chlorine	mg/L	21	10	0	0.55	0.70	1.03	1.20	1.20	None
E. *coli*	MPN/100mL	21	1	1 (Health)	<1	<1	<1	<1	1.00	1
Combined Results for all Sample Points										
pH	-	87	78	0	7.20	7.33	7.58	7.80	7.90	None
Free Chlorine	mg/L	87	78	3* (Health)	0.10	0.22	0.71	1.20	1.50	None
E. *coli*	MPN/100mL	87	5	5 (Health)	<1	<1	<1	<1	6.40	1

* Denotes detection below the ADWG and WHO preferred minimum chlorine residual limit for the reticulation.

Carmila *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	8	8	10	8	8	12	8	14	13	22	20	15
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	1	0	2	0	2	0	0
No. of samples collected in previous 12-month period	105	103	103	105	103	103	105	106	110	115	127	139
No. of failures for previous 12-month period	0	0	0	0	0	0	1	1	3	3	5	5
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.05%	99.06%	97.27%	97.39%	96.06%	96.40%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO

CLERMONT SUPPLY SYSTEM

Clermont Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	52	52	1 (Aesthetic)	14.58	17.45	55.13	102.77	368.70	5.00
Conductivity	µS/cm		52	52	0	115.0	210.6	242.9	293.6	305.0	None
E. coli	MPN/100mL		53	0	0	<1	<1	<1	<1	<1	1.00
Iron	µg/L		52	49	0	<1	1.12	14.51	59.19	192.50	1.00
Manganese	µg/L		52	41	1 (Aesthetic)	<1	<1	10.71	21.66	319.79	1.00
pH			52	52	0	6.95	7.00	7.30	7.72	7.89	None
Residual Chlorine	mg/L		52	52	0	0.85	1.26	2.13	2.95	3.50	None
Total Dissolved Solids (TDS)	mg/L		52	52	0	69.0	126.6	145.8	176.3	183.0	None
Turbidity	NTU		52	32	3* (Health)	<0.1	<0.1	0.24	1.03	2.40	0.10
Alkalinity	mg/L	Monthly	12	12	0	43.4	53.5	82.0	145.1	150.4	None
Bromate	µg/L		12	0	0	<20	<20	<20	<20	<20	20.00
Calcium	mg/L		12	12	0	11.177	11.341	16.455	19.633	20.021	None
Chlorate	µg/L		12	1	0	<20	<20	42.99	169.91	360.30	20.00
Chlorite	µg/L		12	0	0	<20	<20	<20	<20	<20	20.00
Dissolved Oxygen	% Sat		12	12	3 (Aesthetic)	74.8	76.8	90.5	99.4	102.6	None
Fluoride	mg/L		12	1	0	<0.1	<0.1	<0.1	<0.1	0.12	0.10
Magnesium	mg/L		12	12	0	3.32	3.66	5.03	6.23	6.26	None
Nitrate	mg/L		12	11	0	<0.3	0.309	0.640	1.034	1.158	0.30
Nitrite	mg/L		12	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.40
Residual Alkalinity	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Temporary Hardness	mg/L		12	12	0	43.4	53.5	82.0	145.1	150.4	None
THMs	µg/L		12	12	0	60.0	67.9	105.0	148.3	173.0	None
Total Algae	cells/mL		12	0	0	<1	<1	<1	<1	<1	1.00
Total Hardness	mg/L		12	12	0	42	43	62	75	76	None
True Colour	TCU		12	5	0	<1	<1	<1	2	2	1.00

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Ammonia	mg/L	Quarterly	4	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic	µg/L		4	0	0	<1	<1	<1	<1	<1	1.00
Cadmium	µg/L		4	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Chromium	µg/L		4	2	0	<0.1	<0.1	0.24	0.59	0.67	0.10
Copper	µg/L		4	3	0	<1	<1	1.52	2.74	2.97	1.00
Formaldehyde	mg/L		6	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Hydrogen Sulphide	mg/L		4	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Mercury**	µg/L		4	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Pesticides***	µg/L		4	2	0	<0.0001	<0.0001	0.9515	2.9038	3.3327	0.0001
Selenium	mg/L		4	0	0	<5	<5	<5	<5	<5	5.00
Zinc	µg/L		4	4	0	1.03	1.11	1.67	2.27	2.37	1.00
Barium	µg/L	Annually	1	1	0	33.01	33.01	33.01	33.01	33.01	None
Beryllium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Boron	µg/L		1	1	0	23.10	23.10	23.10	23.10	23.10	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20.00
Molybdenum	µg/L		1	1	0	7.96	7.96	7.96	7.96	7.96	1.00
Radionuclides - Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Radionuclides - Gross beta	Bq/L		2	2	0	0.13	0.13	0.13	0.13	0.13	0.10
Silver	µg/L		1	1	0	0.37	0.37	0.37	0.37	0.37	0.10
Tin	µg/L		1	1	0	9.23	9.23	9.23	9.23	9.23	1.00
Uranium	µg/L		1	1	0	3.39	3.39	3.39	3.39	3.39	0.50

* Above the ADWG health limit of 1 NTU for effective chlorine disinfection
* The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.
*** There were two detections of Tebuthiuron, which does not have an ADWG limit threshold. No other pesticides were detected.

Clermont Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: Clermont Network Centenary Park (Jul 2021 - Jun 2022)										
pH	-	6	6	0	7.06	7.11	7.36	7.63	7.70	None
Free Chlorine	mg/L	6	6	0	0.91	0.95	1.59	2.40	2.60	None
E. coli	MPN/100mL	6	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Clermont Network Hospital (Jul 2021 - Jun 2022)										
pH	-	6	6	0	6.83	6.91	7.25	7.51	7.56	6
Free Chlorine	mg/L	6	6	0	1.06	1.17	1.95	2.75	2.80	6
E. coli	MPN/100mL	6	0	0	<1	<1	<1	<1	<1	6
Sample Location: Clermont Network Jeffery Street (Jul 2021 - Jun 2022)										
pH	-	7	7	0	7.01	7.06	7.31	7.71	7.80	None
Free Chlorine	mg/L	7	7	0	0.90	1.10	1.95	2.76	3.00	None
E. coli	MPN/100mL	7	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Clermont Network Library (Jul 2021 - Jun 2022)										
pH	-	12	12	0	7.20	7.24	7.50	7.93	8.03	None
Free Chlorine	mg/L	12	12	0	0.56	0.66	1.47	2.29	2.40	None
E. coli	MPN/100mL	12	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Clermont Network Rose Harris Park (Jul 2021 - Jun 2022)										
pH	-	9	9	0	6.86	7.00	7.35	7.74	7.75	None
Free Chlorine	mg/L	9	9	0	1.28	1.38	1.88	2.62	2.90	None
E. coli	MPN/100mL	9	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Clermont Network Spring Park (Jul 2021 - Jun 2022)										
pH	-	11	11	0	7.02	7.03	7.32	7.71	7.80	None
Free Chlorine	mg/L	11	11	0	1.14	1.17	1.98	2.95	3.00	None
E. coli	MPN/100mL	11	0	0	<1	<1	<1	<1	<1	1.00
Combined Results for all Sample Points										
pH	-	51	51	0	6.83	7.02	7.36	7.80	8.03	None
Free Chlorine	mg/L	51	51	0	0.56	0.91	1.79	2.90	3.00	None
E. coli	MPN/100mL	51	0	0	<1	<1	<1	<1	<1	1.00

Clermont *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	9	8	10	8	8	9	8	8	10	8	8	10
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	106	105	105	105	105	105	104	104	104	104	104	104
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

DYSART SUPPLY SYSTEM

Dysart Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	52	52	3 (Aesthetic)	16.53	25.63	85.21	204.43	406.40	5.00
Conductivity	µS/cm		52	52	0	197.0	198.9	240.3	273.3	352.0	None
E. coli	MPN/100mL		52	0	0	<1	<1	<1	<1	<1	1.00
Iron	µg/L		52	50	0	<1	1.31	14.97	50.70	100.90	1.00
Manganese	µg/L		52	24	0	<1	<1	1.44	3.56	4.27	1.00
pH			52	52	0	7.02	7.09	7.28	7.57	7.79	None
Residual Chlorine	mg/L		52	52	0	1.10	1.33	1.99	2.55	2.80	None
Total Dissolved Solids (TDS)	mg/L		52	52	0	118.0	119.6	144.2	164.0	211.0	None
Turbidity	NTU		50	50	0	0.11	0.12	0.26	0.63	0.85	0.1
Alkalinity	mg/L	Monthly	13	13	0	51.0	51.2	67.7	87.6	88.2	None
Bromate	µg/L		13	0	0	<20	<20	<20	<20	<20	20
Calcium	mg/L		13	13	0	12.987	13.293	16.737	21.357	21.722	None
Chlorate	µg/L		13	0	0	<20	<20	<20	<20	<20	20
Chlorite	µg/L		13	0	0	<20	<20	<20	<20	<20	20
Dissolved Oxygen	% Sat		13	13	3 (Aesthetic)	78.9	79.1	91.3	98.0	99.8	None
Fluoride	mg/L		13	1	0	<0.1	<0.1	<0.1	<0.1	0.1304	0.1
Magnesium	mg/L		13	13	0	4.78	4.80	5.93	7.57	7.78	None
Nitrate	mg/L		13	12	0	<0.3	0.325	0.661	0.944	1.036	0.3
Nitrite	mg/L		13	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.4
Residual Alkalinity	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Temporary Hardness	mg/L		12	12	0	51.0	51.2	67.4	87.7	88.2	None
THMs	µg/L		13	13	0	22.3	22.8	36.9	45.6	45.9	None
Total Algae	cells/mL		12	0	0	<1	<1	<1	<1	<1	1.00
Total Hardness	mg/L		13	13	0	52	53	66	85	86	None
True Colour	TCU		13	5	0	<1	<1	<1	1.4	2	1.00
Ammonia	mg/L	Quarterly	4	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	0.01

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Arsenic	µg/L		4	0	0	<1	<1	<1	<1	<1	1.00
Cadmium	µg/L		4	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Chromium	µg/L		4	2	0	<0.1	<0.1	0.15	0.24	0.25	0.1
Copper	µg/L		4	4	0	3.84	4.25	8.78	14.86	15.93	None
Formaldehyde	mg/L		6	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Hydrogen Sulphide	mg/L		4	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Mercury*	µg/L		4	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		4	2	0	<0.5	<0.5	0.51	0.70	0.72	0.5
Pesticides	µg/L		4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Selenium	µg/L		4	0	0	<5	<5	<5	<5	<5	5.00
Zinc	µg/L		4	4	0	2.18	2.55	5.49	8.95	9.55	None
Barium	µg/L	Annually	1	1	0	30.56	30.56	30.56	30.56	30.56	None
Beryllium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Boron	µg/L		1	1	0	43.39	43.39	43.39	43.39	43.39	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20.0
Molybdenum	µg/L		1	1	0	2.91	2.91	2.91	2.91	2.91	None
Radionuclides - Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Radionuclides - Gross beta	Bq/L		2	2	0	0.12	0.12	0.12	0.12	0.12	None
Silver	µg/L		1	1	0	0.12	0.12	0.12	0.12	0.12	None
Tin	µg/L		1	1	0	8.18	8.18	8.18	8.18	8.18	None
Uranium	µg/L		1	1	0	0.85	0.85	0.85	0.85	0.85	None

* The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.

Dysart Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: Dysart Network Fisher St (Jul 2021 - Jun 2022)*										
pH	-	10	10	0	7.25	7.28	7.47	7.71	7.75	None
Free Chlorine	mg/L	10	10	0	0.97	1.03	1.32	1.63	1.68	None
E. coli	MPN/100mL	10	0	0	<1	<1	<1	<1	<1	1
Sample Location: Dysart Network Centenary Park (Jul 2021 - Jun 2022)										
pH	-	10	10	0	7.13	7.15	7.36	7.60	7.70	None
Free Chlorine	mg/L	10	10	0	0.41	0.63	1.27	1.78	1.82	None
E. coli	MPN/100mL	10	0	0	<1	<1	<1	<1	<1	1
Sample Location: Dysart Network Fox Park (Jul 2021 - Jun 2022)										
pH	-	13	13	0	7.18	7.19	7.41	7.69	7.71	None
Free Chlorine	mg/L	13	13	0	0.94	0.95	1.32	1.65	1.66	None
E. coli	MPN/100mL	13	0	0	<1	<1	<1	<1	<1	1
Sample Location: Dysart Network Gale Street (Jul 2021 - Jun 2022)										
pH	-	3	3	0	7.57	7.57	7.61	7.65	7.65	None
Free Chlorine	mg/L	3	3	0	0.59	0.64	1.03	1.42	1.46	None
E. coli	MPN/100mL	3	0	0	<1	<1	<1	<1	<1	1
Sample Location: Dysart Network Lions Park (Jul 2021 - Jun 2022)										
pH	-	10	10	0	7.22	7.23	7.44	7.76	7.78	None
Free Chlorine	mg/L	10	10	0	0.45	0.74	1.35	1.73	1.76	None
E. coli	MPN/100mL	10	0	0	<1	<1	<1	<1	<1	1
Sample Location: Dysart Network Powell St SPS (Jul 2021 - Jun 2022)										
pH	-	5	5	0	7.31	7.32	7.50	7.66	7.69	None
Free Chlorine	mg/L	5	5	0	0.55	0.60	1.11	1.59	1.62	None
E. coli	MPN/100mL	5	0	0	<1	<1	<1	<1	<1	1
Combined Results for All Sample Points										
pH	-	51	51	0	7.13	7.19	7.44	7.73	7.78	None
Free Chlorine	mg/L	51	51	0	0.41	0.57	1.28	1.71	1.82	None
E. coli	MPN/100mL	51	0	0	<1	<1	<1	<1	<1	1

* Samples from sample points 1 Fisher Street, 5 Fisher Street and Fisher Street Sports Complex have been combined into a single reporting location.

Dysart *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	8	8	10	8	8	9	8	8	10	8	8	10
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	106	104	104	104	104	104	103	103	103	103	103	103
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

GLENDEN SUPPLY SYSTEM

Glenden Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	51	51	0	8.46	12.50	28.45	53.20	75.47	5.00
Conductivity	µS/cm		51	51	0	106.0	165.5	194.7	226.5	265.0	None
E. coli	MPN/100mL		51	0	0	<1	<1	<1	<1	<1	1.00
Iron	µg/L		51	51	0	4.3	6.70	13.75	28.62	34.79	1.00
Manganese	µg/L		51	48	0	<1	<1	3.16	7.27	8.18	1.00
pH			51	51	0	6.75	6.93	7.06	7.20	7.25	None
Residual Chlorine	mg/L		51	51	0	1.05	1.10	1.39	1.88	2.10	None
Total Dissolved Solids (TDS)	mg/L		51	51	0	64.0	99.5	116.8	136.0	159.0	None
Turbidity	NTU		51	13	0	<0.1	<0.1	0.12	0.37	0.42	0.10
Alkalinity	mg/L	Monthly	12	12	0	33.3	33.7	44.9	60.3	71.5	None
Bromate	µg/L		12	0	0	<20	<20	<20	<20	<20	20.0
Calcium	mg/L		12	12	0	14.095	14.118	17.233	19.539	19.749	None
Chlorate	µg/L		12	10	0	<20	<20	254.50	521.51	592.99	20.0
Chlorite	µg/L		12	0	0	<20	<20	<20	<20	<20	20.0
Dissolved Oxygen	% Sat		12	12	1 (Aesthetic)	83.6	85.0	93.5	100.3	100.4	None
Fluoride	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Magnesium	mg/L		12	12	0	2.31	2.32	3.19	4.55	4.59	None
Nitrate	mg/L		12	7	0	<0.3	<0.3	0.653	1.958	3.459	0.30
Nitrite	mg/L		12	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.40
Residual Alkalinity	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Temporary Hardness	mg/L		12	12	0	33.3	33.7	44.9	60.3	71.5	None
THMs	µg/L		12	12	0	<1	3.7	44.2	96.0	96.0	None
Total Algae	cells/mL		12	0	0	<1	<1	<1	<1	<1	1.00
Total Hardness	mg/L		12	12	0	45	45	56	67	67	None
True Colour	TCU		12	2	0	<1	<1	<1	1.45	2	1.00
Ammonia	mg/L	Quarterly	4	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic	µg/L		4	0	0	<1	<1	<1	<1	<1	1.00

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Cadmium	µg/L		4	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Chromium	µg/L		4	4	0	0.135	0.1359	0.23	0.35	0.36	0.10
Copper	µg/L		4	4	0	2.24	2.51	3.86	4.88	5.02	1.00
Formaldehyde	mg/L		6	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Hydrogen Sulphide	mg/L		4	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Mercury*	µg/L		4	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Pesticides	µg/L		4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Selenium	µg/L		4	0	0	<5	<5	<5	<5	<5	5.00
Zinc	µg/L		4	4	0	2.41	2.55	3.16	3.51	3.54	1.00
Barium	µg/L	Annually	1	1	0	16.70	16.70	16.70	16.70	16.70	None
Beryllium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Boron	µg/L		1	1	0	13.50	13.50	13.50	13.50	13.50	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20.00
Molybdenum	µg/L		1	1	0	1.79	1.79	1.79	1.79	1.79	1.00
Radionuclides - Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.04
Radionuclides - Gross beta	Bq/L		2	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Silver	µg/L		1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Tin	µg/L		1	1	0	8.14	8.14	8.14	8.14	8.14	1.00
Uranium	µg/L		1	1	0	0.57	0.57	0.57	0.57	0.57	0.50

*The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.

Glenden Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: Glenden Network 7B Usher Terrace (Jul 2021 - Jun 2022)										
pH	-	12	12	0	7.05	7.08	7.19	7.37	7.45	None
Free Chlorine	mg/L	12	12	0	0.70	0.76	1.34	2.15	2.40	None
E. coli	MPN/100mL	12	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Glenden Network Depot (Jul 2021 - Jun 2022)										
pH	-	14	14	0	6.75	6.75	7.05	7.44	7.50	None
Free Chlorine	mg/L	14	14	0	0.80	0.80	1.19	1.57	1.60	None
E. coli	MPN/100mL	14	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Glenden Network Golf Club (Jul 2021 - Jun 2022)										
pH	-	12	12	0	7.15	7.15	7.32	7.50	7.50	None
Free Chlorine	mg/L	12	12	0	0.68	0.75	1.13	1.73	1.86	None
E. coli	MPN/100mL	12	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Glenden Network Library (Jul 2021 - Jun 2022)										
pH	-	12	12	0	7.20	7.20	7.38	7.78	8.00	None
Free Chlorine	mg/L	12	12	0	0.65	0.68	1.06	1.49	1.52	None
E. coli	MPN/100mL	12	0	0	<1	<1	<1	<1	<1	1.00
Combined Results for All Sample Points										
pH	-	50	50	0	6.75	6.85	7.23	7.50	8.00	None
Free Chlorine	mg/L	50	50	0	0.65	0.70	1.18	1.87	2.40	None
E. coli	MPN/100mL	50	0	0	<1	<1	<1	<1	<1	1.00

Glenden *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	8	8	10	8	8	9	8	8	10	8	6	10
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	106	104	104	104	104	104	103	103	103	103	103	101
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

MIDDLEMOUNT SUPPLY SYSTEM

Middlemount Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	52	50	0	<5	<5	10.29	30.12	122.07	5.00
Conductivity	µS/cm		52	52	0	99.0	184.6	230.6	296.5	514.0	None
E. coli	MPN/100mL		52	0	0	<1	<1	<1	<1	<1	1.00
Iron	µg/L		52	49	0	<1	<1	6.12	16.10	30.54	1.00
Manganese	µg/L		52	21	0	<1	<1	3.09	4.36	95.07	1.00
pH			54	54	0	7.01	7.05	7.24	7.47	7.55	None
Residual Chlorine	mg/L		52	52	0	0.64	1.26	2.07	2.88	3.45	None
Total Dissolved Solids (TDS)	mg/L		52	52	0	59.0	110.6	138.3	177.5	308.0	None
Turbidity	NTU		52	51	0	<0.1	0.11	0.18	0.28	0.31	0.10
Alkalinity	mg/L	Monthly	12	12	0	45.2	45.5	70.9	115.6	146.4	None
Bromate	µg/L		12	0	0	<20	<20	<20	<20	<20	20.0
Calcium	mg/L		12	12	0	11.191	11.228	15.703	22.466	23.386	None
Chlorate	µg/L		12	1	0	<20	<20	41.95	164.30	347.84	20.0
Chlorite	µg/L		12	0	0	<20	<20	<20	<20	<20	20.0
Dissolved Oxygen	% Sat		12	12	1 (Aesthetic)	82.5	85.6	92.9	100.1	101.1	None
Fluoride	mg/L		12	4	0	<0.1	<0.1	<0.1	0.146	0.162	0.10
Magnesium	mg/L		12	12	0	4.23	4.35	5.79	7.79	7.92	None
Nitrate	mg/L		12	11	0	<0.3	<0.3	0.861	1.626	1.952	0.30
Nitrite	mg/L		12	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.40
Residual Alkalinity	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Temporary Hardness	mg/L		12	12	0	45.2	45.5	70.9	115.6	146.4	None
THMs	µg/L		12	12	0	110.0	117.2	174.5	223.6	234.0	None
Total Algae	cells/mL		12	0	0	<1	<1	<1	<1	<1	1.00
Total Hardness	mg/L		12	12	0	45	46	63	88	91	None
True Colour	TCU		12	5	0	<1	<1	<1	2	2	1.00
Ammonia	mg/L	Quarterly	4	1	0	<0.01	<0.01	<0.01	0.0102	0.0107	0.01
Arsenic	µg/L		4	1	0	<1	<1	<1	<1	1.036	1.00

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Cadmium	µg/L		4	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Chromium	µg/L		4	3	0	<0.1	<0.1	0.19	0.39	0.44	0.10
Copper	µg/L		4	4	0	21.73	21.81	29.71	38.50	38.95	1.00
Formaldehyde	mg/L		5	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Hydrogen Sulphide	mg/L		3	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Mercury*	µg/L		4	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		4	4	0	0.597	0.640	0.87	1.04	1.05	None
Pesticides	µg/L		3	0	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Selenium	µg/L		4	0	0	<5	<5	<5	<5	<5	5.00
Zinc	µg/L		4	4	0	6.72	6.75	7.63	8.91	9.13	1.00
Barium	µg/L	Annually	1	1	0	28.44	28.44	28.44	28.44	28.44	None
Beryllium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Boron	µg/L		1	1	0	35.98	35.98	35.98	35.98	35.98	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20.00
Molybdenum	µg/L		1	1	0	1.61	1.61	1.61	1.61	1.61	1.00
Radionuclides – Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.04
Radionuclides – Gross beta	Bq/L		2	2	0	0.20	0.20	0.20	0.20	0.20	0.10
Silver	µg/L		1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Tin	µg/L		1	1	0	7.25	7.25	7.25	7.25	7.25	1.00
Uranium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.5

* The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.

Middlemount Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: Middlemount Network Emu Park (Jul 2021 - Jun 2022)										
pH	-	15	15	0	6.88	7.04	7.43	7.73	7.91	None
Free Chlorine	mg/L	15	14	1 (Health)	<0.02	0.28	0.95	1.70	1.84	None
E. coli	MPN/100mL	15	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Middlemount Network Footy Fields (Jul 2021 - Jun 2022)										
pH	-	13	13	0	7.15	7.23	7.49	7.76	7.93	None
Free Chlorine	mg/L	13	13	0	0.49	0.58	1.16	2.12	2.40	None
E. *coli*	MPN/100mL	13	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Middlemount Network Kookaburra Park (Jul 2021 - Jun 2022)										
pH	-	9	9	0	7.26	7.32	7.46	7.69	7.81	None
Free Chlorine	mg/L	9	8	1 (Health)	<0.02	0.20	0.82	1.45	1.46	None
E. *coli*	MPN/100mL	9	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Middlemount Network MMT Golf Course (Jul 2021 - Jun 2022)										
pH	-	12	12	0	7.24	7.27	7.59	7.89	7.98	None
Free Chlorine	mg/L	12	11	1 (Health)	<0.02	0.22	0.70	1.26	1.40	None
E. *coli*	MPN/100mL	12	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Middlemount Network Reservoir (Jul 2021 - Jun 2022)										
pH	-	3	3	0	7.50	7.52	7.65	7.76	7.77	None
Free Chlorine	mg/L	3	3	1 (Health)	0.04	0.13	0.75	1.28	1.32	None
E. *coli*	MPN/100mL	3	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Middlemount Network Shopping Centre (Jul 2021 - Jun 2022)										
pH	-	8	8	0	7.30	7.33	7.49	7.76	7.87	None
Free Chlorine	mg/L	8	8	1 (Health)	0.02	0.21	0.77	1.28	1.35	None
E. *coli*	MPN/100mL	8	0	0	<1	<1	<1	<1	<1	1.00

Combined Results for All Sample Points										
pH	-	60	60	0	6.88	7.15	7.50	7.87	7.98	None
Free Chlorine	mg/L	60	57	5* (Health)	<0.02	<0.02	0.89	1.82	2.40	None
E. *coli*	MPN/100mL	60	0	0	<1	<1	<1	<1	<1	1.00

* Denotes detection below the ADWG and WHO preferred minimum chlorine residual limit for the reticulation.

Middlemount *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	8	8	10	8	8	9	12	13	10	8	8	10
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	106	104	104	104	104	104	103	107	112	112	112	112
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

MORANBAH SUPPLY SYSTEM

Moranbah Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	52	52	0	6.31	9.59	23.73	43.16	53.66	5.00
Conductivity	µS/cm		52	52	0	163.0	170.0	193.2	234.1	262.0	None
E. coli	MPN/100mL		52	0	0	<1	<1	<1	<1	<1	1.00
Fluoride	mg/L		52	50	0	<0.1	0.246	0.584	0.807	0.834	0.10
Iron	µg/L		52	52	0	1.78	2.54	8.98	19.99	46.68	1.00
Manganese	µg/L		52	25	0	<1	<1	1.40	3.50	3.95	1.00
pH			53	53	0	6.96	7.07	7.36	7.51	7.69	None
Residual Chlorine	mg/L		52	52	0	1.13	1.36	1.61	1.85	1.99	None
Total Dissolved Solids (TDS)	mg/L		52	52	0	98.0	102.0	116.0	140.9	157.0	None
Turbidity	NTU		52	49	0	<0.1	<0.1	0.16	0.26	0.36	0.10
Alkalinity	mg/L	Monthly	12	12	0	35.1	37.4	43.0	53.6	60.3	None
Bromate	µg/L		12	0	0	<20	<20	<20	<20	<20	20.00
Calcium	mg/L		12	12	0	9.119	9.269	10.230	11.136	11.145	None
Chlorate	µg/L		12	0	0	<20	<20	<20	<20	<20	20.00
Chlorite	µg/L		12	0	0	<20	<20	<20	<20	<20	20.00
Dissolved Oxygen	% Sat		12	12	0	86.9	88.6	95.5	100.8	102.0	None
Magnesium	mg/L		12	12	0	4.35	4.38	4.87	5.50	5.65	None
Nitrate	mg/L		12	10	0	<0.3	<0.3	0.453	0.766	0.832	0.30
Nitrite	mg/L		12	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.40
Residual Alkalinity	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Temporary Hardness	mg/L		12	12	0	35.1	37.4	42.9	53.6	60.3	None
THMs	µg/L		12	12	0	27.1	29.5	40.1	51.1	56.5	None
Total Algae	cells/mL		15	0	0	<1	<1	<1	<1	<1	1.00
Total Hardness	mg/L		12	12	0	42	42	46	50	51	None
True Colour	TCU		12	2	0	<1	<1	<1	1.45	2	1.00
Ammonia	mg/L	Quarterly	4	0	0	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Arsenic	µg/L		4	0	0	<1	<1	<1	<1	<1	1.00
Cadmium	µg/L		4	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Chromium	µg/L		4	2	0	<0.1	<0.1	0.11	0.19	0.20	0.10
Copper	µg/L		4	1	0	<1	<1	<1	<1	1.04	1.00
Formaldehyde	mg/L		6	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Hydrogen Sulphide	mg/L		4	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Mercury*	µg/L		4	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		4	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Pesticides**	µg/L		3	1	0	<0.0001	<0.0001	0.0084	0.0227	0.0252	0.0001
Selenium	µg/L		4	0	0	<5	<5	<5	<5	<5	5.00
Zinc	µg/L		4	4	0	5.24	5.26	9.87	16.14	16.87	1.00
Barium	µg/L	Annually	1	1	0	29.00	29.00	29.00	29.00	29.00	None
Beryllium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Boron	µg/L		1	1	0	25.03	25.03	25.03	25.03	25.03	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20.00
Molybdenum	µg/L		1	1	0	1.09	1.09	1.09	1.09	1.09	1.00
Radionuclides - Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.04
Radionuclides - Gross beta	Bq/L		2	2	0	0.15	0.15	0.15	0.15	0.15	0.10
Silver	µg/L		1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Tin	µg/L		1	1	0	6.98	6.98	6.98	6.98	6.98	1.00
Uranium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50

* The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.
** There were two detections of 2-methylnaphthalene which does not have an ADWG limit threshold. No other pesticides were detected.

Moranbah Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: Moranbah Network #1 Belyando Ave (Jul 2021 - Jun 2022)										
pH	-	20	20	0	7.18	7.25	7.52	7.66	7.71	None
Free Chlorine	mg/L	20	20	0	0.86	1.18	1.47	1.83	1.90	None
E. coli	MPN/100mL	20	0	0	<1	<1	<1	<1	<1	1.00
Fluoride	mg/L	12	13	0	0.365	0.378	0.601	0.793	0.795	0.1
Sample Location: Moranbah Network #2 cnr Jackson & Cuthbert (Jul 2021 - Jun 2022)										
pH	-	20	20	0	7.18	7.24	7.44	7.60	7.68	None
Free Chlorine	mg/L	20	20	0	1.08	1.10	1.36	1.60	1.62	None
E. coli	MPN/100mL	20	0	0	<1	<1	<1	<1	<1	1.00
Fluoride	mg/L	12	13	0	0.279	0.370	0.589	0.797	0.813	0.1
Sample Location: Moranbah Network #3 1A Archer Drive (Jul 2021 - Jun 2022)										
pH	-	19	19	0	7.20	7.25	7.52	7.75	7.75	None
Free Chlorine	mg/L	19	19	0	0.98	1.02	1.35	1.67	1.77	None
E. coli	MPN/100mL	19	0	0	<1	<1	<1	<1	<1	1.00
Fluoride	mg/L	12	11	0	0.187	0.280	0.585	0.782	0.789	0.1
Sample Location: Moranbah Network #4 Binda Park (Jul 2021 - Jun 2022)										
pH	-	20	20	0	7.11	7.12	7.39	7.55	7.63	None
Free Chlorine	mg/L	20	20	0	1.07	1.24	1.45	1.79	1.82	None
E. coli	MPN/100mL	20	0	0	<1	<1	<1	<1	<1	1.00
Fluoride	mg/L	12	12	0	0.209	0.302	0.584	0.804	0.820	0.1
Sample Location: Moranbah Network #5 O'Neil St (Jul 2021 - Jun 2022)										
pH	-	20	20	0	7.11	7.29	7.40	7.50	7.66	None
Free Chlorine	mg/L	20	20	0	0.58	0.61	1.07	1.39	1.56	None
E. coli	MPN/100mL	20	0	0	<1	<1	<1	<1	<1	1.00
Fluoride	mg/L	12	11	0	0.179	0.277	0.587	0.792	0.794	0.1
Combined Results for All Sample Points										
pH	-	99	99	0	7.11	7.20	7.45	7.68	7.75	None
Free Chlorine	mg/L	99	99	0	0.58	0.85	1.34	1.78	1.90	None
E. coli	MPN/100mL	99	0	0	<1	<1	<1	<1	<1	1.00
Fluoride	mg/L	60	60	0	0.179	0.276	0.589	0.794	0.820	0.1

Moranbah *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	12	12	14	12	12	13	12	12	14	12	12	14
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	118	116	116	116	116	120	125	129	133	138	142	146
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

NEBO SUPPLY SYSTEM

Nebo Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	53	53	0	<5	<5	<5	13.40	28.40	5.00
Conductivity	µS/cm		54	54	0	204.3	848.7	959.9	1077.4	1263.4	None
E. coli	MPN/100mL		54	0	0	<1	<1	<1	<1	<1	1.00
Iron	µg/L		53	42	0	<1	<1	6.12	22.15	57.19	1.00
Manganese	µg/L		53	16	0	<1	<1	1.00	2.66	3.38	1.00
pH			53	53	0	6.67	7.01	7.28	7.69	7.77	None
Residual Chlorine	mg/L		53	53	0	1.04	1.14	1.34	1.53	1.60	None
Total Dissolved Solids (TDS)	mg/L		53	53	22 (Aesthetic)	183.0	518.4	584.5	646.4	758.0	None
Turbidity	NTU		53	7	0	<0.1	<0.1	<0.1	0.16	0.33	0.10
Alkalinity	mg/L	Monthly	13	13	0	63.9	128.4	175.8	199.0	204.7	None
Bromate	µg/L		12	0	0	<20	<20	<20	<20	<20	20.00
Calcium	mg/L		51	51	0	15.54	40.62	44.56	50.0	51.95	None
Chlorate	µg/L		12	1	0	<20	<20	<20	38.82	56.8	20.00
Chlorite	µg/L		12	0	0	<20	<20	<20	<20	<20	20.00
Dissolved Oxygen	% Sat		13	13	1 (Aesthetic)	83.5	85.3	90.4	94.5	94.8	None
Fluoride	mg/L		13	5	0	<0.1	<0.1	<0.1	0.121	0.122	0.10
Magnesium	mg/L		51	51	0	6.63	22.87	25.75	30.06	32.18	None
Nitrate	mg/L		13	12	0	<0.3	0.447	1.921	2.612	2.786	None
Nitrite	mg/L		13	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.40
Residual Alkalinity	mg/L		12	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Temporary Hardness	mg/L		12	12	0	171.4	171.5	185.1	199.5	204.7	None
THMs	µg/L		12	12	0	<1	4.7	11.7	18.4	18.9	None
Total Hardness	mg/L		54	54	50 (Aesthetic)	66	197	219	245	261	None
True Colour	TCU		13	4	0	<1	<1	<1	1	1	1.00
Ammonia	mg/L	Quarterly	4	1	0	<0.01	<0.01	<0.01	0.010	0.011	0.01
Arsenic	µg/L		5	0	0	<1	<1	<1	<1	<1	1.00

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Cadmium	µg/L		5	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Chromium	µg/L		5	4	0	<0.1	<0.1	0.34	0.58	0.59	0.10
Copper	µg/L		5	5	0	5.44	5.59	11.96	17.79	18.12	1.00
Formaldehyde	mg/L		6	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Hydrogen Sulphide	mg/L		4	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		5	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Mercury*	µg/L		4	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		5	3	0	<0.5	<0.5	0.66	1.03	1.08	0.50
Pesticides	µg/L		4	0	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Selenium	µg/L		5	0	0	<5	<5	<5	<5	<5	5.00
Zinc	µg/L		5	5	0	3.32	3.40	4.05	4.96	5.13	1.00
Barium	µg/L	Annually	2	2	0	17.77	18.29	23.04	27.78	28.31	None
Beryllium	µg/L		2	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Boron	µg/L		2	2	0	18.90	19.35	23.38	27.41	27.86	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20
Molybdenum	µg/L		2	1	0	<1	<1	1.37	1.97	2.04	1.00
Radionuclides - Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Radionuclides - Gross beta	Bq/L		2	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Silver	µg/L		2	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Tin	µg/L		2	2	0	5.33	7.03	22.40	37.76	39.47	1.00
Uranium	µg/L		2	2	0	0.85	0.89	1.32	1.75	1.79	0.50

* The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.

Nebo Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: Nebo Network Airstrip Rd (Jul 2021 - Jun 2022)										
pH	-	11	11	0	7.10	7.11	7.34	7.58	7.60	None
Free Chlorine	mg/L	11	11	0	1.04	1.11	1.25	1.36	1.38	None
E. coli	MPN/100mL	11	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Nebo Network CIVEO (Jul 2021 - Jun 2022)										
pH	-	7	7	0	6.71	6.82	7.29	7.73	7.80	None
Free Chlorine	mg/L	7	7	0	1.12	1.16	1.34	1.55	1.58	None
E. coli	MPN/100mL	7	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Nebo Network Depot (Jul 2021 - Jun 2022)										
pH	-	3	3	0	7.11	7.13	7.24	7.31	7.31	None
Free Chlorine	mg/L	3	3	0	1.27	1.28	1.33	1.39	1.40	None
E. coli	MPN/100mL	3	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Nebo Network Ian's House (Jul 2021 - Jun 2022)										
pH	-	7	7	0	7.14	7.17	7.37	7.55	7.55	None
Free Chlorine	mg/L	7	7	0	1.06	1.08	1.34	1.68	1.68	None
E. coli	MPN/100mL	7	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Nebo Network Rodeo Grounds (Jul 2021 - Jun 2022)										
pH	-	1	1	0	7.30	7.30	7.30	7.30	7.30	None
Free Chlorine	mg/L	1	1	0	1.30	1.30	1.30	1.30	1.30	None
E. coli	MPN/100mL	1	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Nebo Network Saleyards Drive (Jul 2021 - Jun 2022)										
pH	-	1	1	0	7.45	7.45	7.45	7.45	7.45	None
Free Chlorine	mg/L	1	1	0	1.28	1.28	1.28	1.28	1.28	None
E. coli	MPN/100mL	1	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: Nebo Network Servo (Jul 2021 - Jun 2022)										
pH	-	4	4	0	7.19	7.20	7.39	7.66	7.70	None
Free Chlorine	mg/L	4	4	0	1.32	1.32	1.38	1.47	1.49	None
E. coli	MPN/100mL	4	0	0	<1	<1	<1	<1	<1	1.00

Sample Location: Nebo Network Water Tower (Jul 2021 - Jun 2022)										
pH	-	15	15	0	7.04	7.06	7.40	7.80	7.83	None
Free Chlorine	mg/L	15	15	0	0.80	1.02	1.32	1.51	1.55	None
E. coli	MPN/100mL	15	0	0	<1	<1	<1	<1	<1	1.00
Combined Results for All Sample Points										
pH	-	49	49	0	6.71	7.06	7.36	7.76	7.83	None
Free Chlorine	mg/L	49	49	0	0.80	1.08	1.31	1.57	1.68	None
E. coli	MPN/100mL	49	0	0	<1	<1	<1	<1	<1	1.00

Nebo *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	7	8	10	8	8	9	9	8	10	8	8	10
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	106	100	101	103	104	104	103	104	104	103	103	103
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

ST LAWRENCE SUPPLY SYSTEM

St Lawrence Treated Water

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Aluminium	µg/L	Weekly	35	35	4 (Aesthetic)	14.68	17.63	100.66	474.53	598.42	5.00
Conductivity	µS/cm		34	34	0	175.0	185.3	264.6	401.4	432.0	None
E. coli	MPN/100mL		34	0	0	<1	<1	<1	<1	<1	1.00
Iron	µg/L		35	35	0	1.191	3.03	28.63	109.61	124.10	1.00
Manganese	µg/L		35	35	16 (Health - 4, Aesthetic - 12)	12.173	18.7197	203.74	886.45	1297.88	1.00
pH			34	34	0	7.35	7.43	7.66	7.80	7.95	None
Residual Chlorine	mg/L		34	34	0	0.70	1.76	2.10	2.64	2.80	None
Total Dissolved Solids (TDS)	mg/L		34	34	0	105.0	111.0	158.7	240.6	259.0	None
Turbidity*	NTU		34	31	1 (Health)	<0.1	<0.1	0.27	0.89	1.20	0.10
Alkalinity	mg/L	Monthly	8	8	0	54.7	55.1	93.9	187.0	230.0	None
Bromate	µg/L		8	0	0	<20	<20	<20	<20	<20	20.00
Calcium	mg/L		8	8	0	5.474	5.641	10.373	16.618	17.957	None
Chlorate	µg/L		8	7	0	<20	31.27	195.78	531.29	542.92	20.00
Chlorite	µg/L		8	0	0	<20	<20	<20	<20	<20	20.00
Dissolved Oxygen	% Sat		8	8	3 (Aesthetic)	68.3	71.1	87.2	99.7	101.4	None
Fluoride	mg/L		8	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Magnesium	mg/L		8	8	0	2.41	2.44	3.78	6.11	6.59	None
Nitrate	mg/L		8	4	0	<0.3	<0.3	0.454	1.172	1.548	0.30
Nitrite	mg/L		8	0	0	<0.4	<0.4	<0.4	<0.4	<0.4	0.40
Residual Alkalinity	mg/L		8	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Temporary Hardness	mg/L		8	8	0	54.7	55.1	93.8	187.0	230.0	None
THMs	µg/L		8	8	0	29.9	42.6	92.1	147.0	169.0	None
Total Algae	cells/mL		8	0	0	<1	<1	<1	<1	<1	1.00

Parameter	Units	Frequency	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Total Hardness	mg/L		8	8	0	24	24	41	67	72	None
True Colour	TCU		8	4	0	<1	<1	1.35	2.65	3	1.00
Ammonia	mg/L	Quarterly	3	1	0	<0.01	<0.01	<0.01	0.013	0.013	0.01
Arsenic	µg/L		3	0	0	<1	<1	<1	<1	<1	1.00
Cadmium	µg/L		3	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Chromium	µg/L		3	1	0	<0.1	<0.1	0.11	0.19	0.20	0.10
Copper	µg/L		3	2	0	<1	1.43	6.16	9.69	9.89	1.00
Formaldehyde	mg/L		5	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Hydrogen Sulphide	mg/L		3	0	0	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Lead	µg/L		3	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Mercury**	µg/L		3	0	0	<0.05	<0.05	<0.5	<0.5	<0.5	0.05
Nickel	µg/L		3	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Pesticides	µg/L		3	0	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001
Selenium	µg/L		3	0	0	<5	<5	<5	<5	<5	5.00
Zinc	µg/L		3	3	0	2.15	2.27	4.53	7.62	8.10	1.00
Barium	µg/L	Annually	1	1	0	8.67	8.67	8.67	8.67	8.67	None
Beryllium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50
Boron	µg/L		1	1	0	27.15	27.15	27.15	27.15	27.15	None
Iodide	µg/L		1	0	0	<20	<20	<20	<20	<20	20.00
Molybdenum	µg/L		1	0	0	<1	<1	<1	<1	<1	1.00
Radionuclides - Gross alpha	Bq/L		2	0	0	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
Radionuclides - Gross beta	Bq/L		2	2	0	0.14	0.14	0.14	0.14	0.14	0.10
Silver	µg/L		1	0	0	<0.1	<0.1	<0.1	<0.1	<0.1	0.10
Tin	µg/L		1	1	0	5.98	5.98	5.98	5.98	5.98	1.00
Uranium	µg/L		1	0	0	<0.5	<0.5	<0.5	<0.5	<0.5	0.50

* Above the ADWG health limit of 1 NTU turbidity for effective chlorine disinfection

** The Mercury LOR changed from <0.05 µg/L to <0.5 µg/L during the year. Both values are below the ADWG health limit of 1 µg/L.

St Lawrence Reticulation

Parameter	Units	No. Samples	Detections	Exceedances	Min	5th %ile	Average	95th %ile	Max	LOR
Sample Location: St Lawrence Network 36 Macartney St (Jul 2021 - Jun 2022)										
pH	-	46	46	0	7.45	7.50	7.67	7.84	7.94	None
Free Chlorine	mg/L	46	46	4 (Health)	0.09	0.14	0.38	1.18	1.80	None
E. coli	MPN/100mL	46	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: St Lawrence Network WTP Sample Tap (Jul 2021 - Jun 2022)										
pH	-	5	5	0	7.50	7.52	7.68	7.84	7.85	None
Free Chlorine	mg/L	5	5	0	0.50	0.58	0.96	1.34	1.40	None
E. coli	MPN/100mL	5	0	0	<1	<1	<1	<1	<1	1.00
Sample Location: St Lawrence Reservoir (Jul 2021 - Jun 2022)										
pH	-	2	2	0	7.55	7.56	7.60	7.65	7.65	None
Free Chlorine	mg/L	2	2	0	2.40	2.41	2.50	2.59	2.60	None
E. coli	MPN/100mL	2	0	0	<1	<1	<1	<1	<1	1.00
Combined Results for All Sample Points										
pH	-	53	53	0	7.45	7.50	7.67	7.85	7.94	None
Free Chlorine	mg/L	53	53	4* (Health)	0.09	0.15	0.52	1.67	2.60	None
E. coli	MPN/100mL	53	0	0	<1	<1	<1	<1	<1	1.00

* Denotes detection below the ADWG and WHO preferred minimum chlorine residual limit for the reticulation.

St Lawrence *E. coli* Compliance

Year	2021-2022											
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
No. of samples collected	8	8	10	8	8	10	4	4	5	7	5	8
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	106	104	104	104	104	104	104	100	96	91	90	87
No. of failures for previous 12-month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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