Unitywater

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Drinking Water Quality Management Plan

Annual Report 2021-22

Report Details

Report Writer	Water Quality Officer
References	Drinking Water Quality Management Plan Version 11a Department of Regional Development, Manufacturing and Water Annual Report Guidelines

Document Version and Modification Control

Date	Name	Position	Modification/ Action
13/7/22	Z. Lamont	Water Quality Officer	Draft
25/7/2022	J. Wain	Water Quality Manager	Draft
1/8/2022	I.Beirne	Head of Asset Management	Final

Service Provider Details	
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Local Government Areas	Moreton Bay Regional Council Noosa Council Sunshine Coast Council

Objective reference No:

Glossary of Terms	
<	Less than
>	Greater than
ADWG	Australian Drinking Water Guidelines (2011). Published by the National Health and Medical Research Council of Australia
CCP	Critical Control Point
CCPP	Calcium Carbonate Precipitation Potential
CFU/100mL	Colony forming units per 100 millilitres
DRDMW	Department of Regional Development, Manufacturing and Water (the regulator)
DWQMP	Drinking Water Quality Management Plan
E. coli	*Escherichia coli*, a bacterium which may indicate the presence of faecal contamination and therefore potential health risk
FY 2021-22	Financial Year 2021-22
HACCP	Hazard Analysis and Critical Control Point. An approach for managing the risk of drinking water supply contamination
LIMS	Laboratory Information Management System
mg/L	Milligrams per litre
ML	Megalitres
MPN/100 mL	Most probable number per 100 millilitres
NPI	Northern Pipeline Interconnector
OFI	Opportunities for Improvement
OPRP	Operational Pre-Requisite Program
RMIP	Risk Management Improvement Plan
SEQ	South East Queensland
SCADA	Supervisory Control and Data Acquisition
WCI	Wellbeing and Continuous Improvement (Unitywater work area)
the Act	*Water Supply (Safety & Reliability) Act 2008*
WQ	Water Quality
WTP	Water Treatment Plant

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1. Introduction

This report documents the performance of Unitywater's drinking water service with respect to water quality and performance in implementing the Drinking Water Quality Management Plan (DWQMP) as required under *the Water Supply (Safety and Reliability) Act 2008* (*the Act*). This report documents Unitywater's performance for the period 1 July 2021 to 30 June 2022 and should be read in conjunction with the Drinking Water Quality Performance Report 2021-2022 (Appendix A).

The report aligns with the requirements of the reporting template published by the Regulator and addresses the reporting requirements under Section 142(3) of the Act. Table 1 identifies the section of the report that addresses reporting requirement under Section 142(3) of the Act.

Table 1 - Sections of report that address reporting requirement under Section 142(3) of the Act

Section Ref	Legislative Requirement under Section 142(3) of the Act	Content guide	Section of this report
-	Overview of operations (optional)	Contextual information of the water supply schemes that this annual report relates to.	Section 2
142(3) b	Actions taken to implement the DWQMP	Description of activities undertaken during the reporting period to implement the DWQMP: • Progress in implementing the risk management improvement program (RMIP) • Revisions made to the operational monitoring program • Amendments made to the DWQMP	Section 3
142(3) f	Compliance with water quality criteria for drinking water	• Verification monitoring results summary for the reporting period • Commentary on water quality results, the Australian Drinking Water Guidelines and *E. coli* results	Section 4 Appendix A
142(3) e	Notifications to the Regulator under sections 102 and 102A of *the Act*	• Non-compliances with the water quality criteria and corrective and preventive actions undertaken • Prescribed incidents or events reported to the Regulator and corrective and preventive actions undertaken	Section 5
142(3) g	Customer complaints related to water quality	• Summary of water quality complaints • Summary of events and corrective action	Section 6 Appendix B
142(3) d	Findings and recommendations of the DWQMP audit	• Regulatory audit summary of findings • Outcomes of the DWQMP review	Section 7
142(3) c	Outcome of the DWQMP review and how issues raised have been addressed	Amendment of the DWQMP	Section 8

2. Overview of Operations

Unitywater provides water and sewerage services to the Moreton Bay, Sunshine Coast and Noosa local authority regions. Unitywater operates and maintains more than $3.8 billion of water and sewerage infrastructure, supplying services to residential and business customers spread across 5,924 square kilometres.

Unitywater receives treated water from the bulk water supplier Seqwater. The Unitywater service area during the 2021-22 FY had 4 supply regions, which are broken down into 14 schemes. These regions include:

- **NPI South (Southern Grid)** – Caboolture, Bribie Island, Woodford, Redcliffe, Pine Rivers South, Pine Rivers North
- **NPI North (Northern Grid)** – Noosa, Maroochy North (South Maroochy River); Maroochy South, Caloundra Coastal, Caloundra Railway Towns, Maleny
- **Dayboro** – Dayboro
- **Kenilworth** – Kenilworth

Additional information is available in the 2021-22 Drinking water quality performance report (Appendix A).

3. Actions taken to implement the Drinking Water Quality Management Plan

Unitywater's DWQMP has evolved since the first revision was submitted in 2011 and it will continue to be updated as risk management improvement actions are completed and operational philosophies change. A description of the implementation progress and related updates made during the 2021-22 FY are provided below.

3.1. Risk management improvement action progress

Generally only risks with a high residual rating are included in Unitywater's DWQMP, but in the pursuit of continual improvement, medium residual risks located at reservoir sites have been noted and included in the current approved DWQMP RMIP (Table 7 of the approved DWQMP). The hazardous events/risk categories are as follows:

- Contamination/ingress event occurring at a reservoir site (8 actions identified)
- Cybersecurity breach (1 action identified)

Of the 9 actions identified, 8 have been completed with the remaining 1 in progress. With the current approved DWQMP under review, the remaining action will be taken into consideration during the whole of system risk assessment and compilation of a new and updated RMIP.

3.2. Revisions made to the operational monitoring program to assist in maintaining the compliance with water quality criteria in verification monitoring

ISO 22000:2018 Recertification Audit – Unitywater's Drinking Water Management System (DWMS) is certified against the international standard ISO 22000:2018 Food Safety Management Systems, recognised as best practice for the management of drinking water quality. A component of the certification is the Hazard Analysis Critical Control Point (HACCP) process. The HACCP Plan describes the control measures for significant risks including critical control points (CCPs), prerequisite programs (PRPs) and operational prerequisite programs (OPRPs).

In April 2022, Unitywater underwent an ISO 22000 recertification audit and was found to be compliant to the requirements of the standard, with only two minor non-conformances received. The auditor called this outcome an 'exceptional result for a recertification given the complexity of the organisation'.

3.3. Amendments made to the Drinking Water Quality Management Plan

The current version of the DWQMP is version 11a, which including amendments was approved by the regulator on 20th July 2021. There were no amendments made to the DWQMP during the 2021-22 FY and the next review of the DWQMP is due by 30th October 2022. As part of the review we are conducting a DWQMP risk assessment which will inform the development of the new Risk Management Improvement Program (RMIP).

4. Compliance with water quality criteria for drinking water

Unitywater provides an annual summary of water quality performance to customers, available on the Unitywater website www.unitywater.com. The 2021-22 Drinking Water Quality Performance Report (Appendix A) meets the requirements for the water quality performance aspect of this document. Please note that the reported statistics do not include results derived from repeat samples, or from emergency or investigative samples undertaken in response to an elevated result.

The 2021-22 Drinking Water Quality Performance Report includes a summary of the verification monitoring results. Key points include:

- Unitywater meets the requirements set by the *Public Health Regulation 2018* for drinking water, with 99.94% of all samples free of *E. coli.*
- Unitywater meets the chemical (health related) performance requirements of the Australian Drinking Water Guidelines 2011 for every chemical tested in each of the 4 regions.

5. Notifications to the Regulator under sections 102 and 102A of *the Act*

5.1. Summary of Notifications

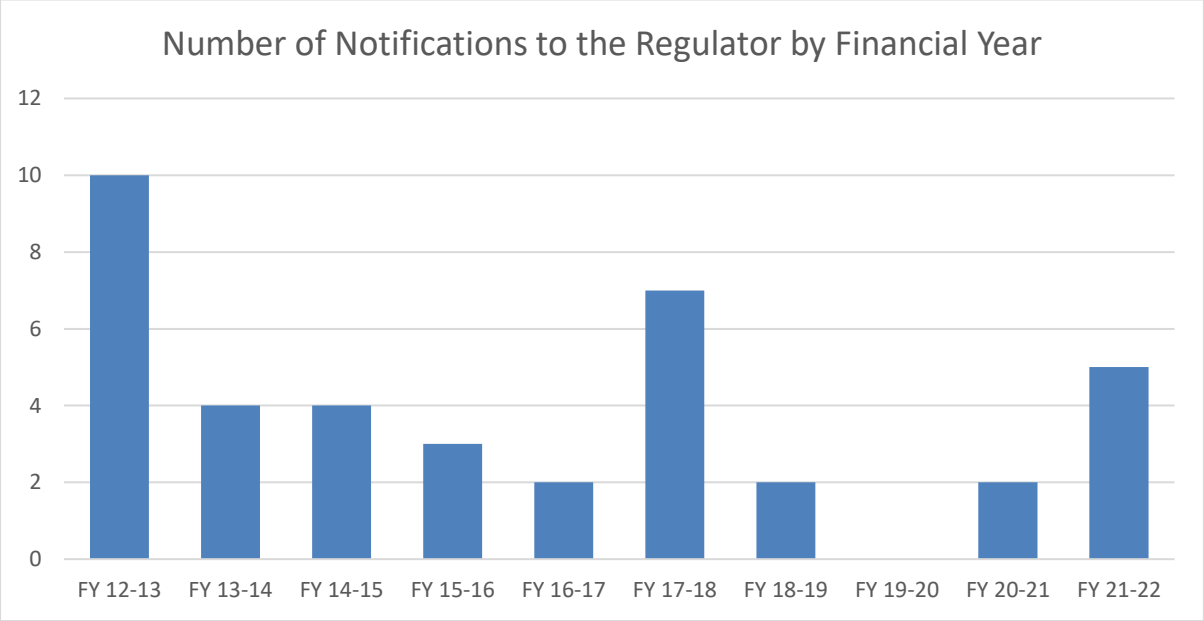
There were five notifications made to the regulator during this financial year. Four notifications were for non-compliances of parameters with a water quality criteria, and one was a notification of a drinking water event. Please see Table 2 for more details.

Table 2 – Summary of notifications to the regulator in FY 21-22

Incident Description	Corrective and Preventative Actions
E. coli was detected in a routine sample taken on 10/11/21 at Browns Rd NPI Offtake from sample tap PN23BS. The result was 2 MPN/100mL in the presence of 3.08 mg/L total chlorine and 0.15 mg/L free chlorine.	Initial investigation of the bulk supply sample point included an assessment of any planned or unplanned works, recent water quality data and sampling conditions. No previous detections of *E. coli* have occurred at this sample point. Seqwater confirmed that there were no issues at the North Pine water treatment plant which could have contributed to the *E. coli* detection. Immediate resampling was carried out and *E. coli* was not detected in the resample. Investigation identified that the *E. coli* detection was due to a sampling error from the Scientific Services team where the tap was not correctly sterilised before sampling. From this it was concluded that the sample was not representative of water in the main. Measures have been taken to reduce the occurrence of sample contamination including additional training and information on sampling procedure for the Scientific Services team and potential sources of contamination during sampling.
A bromate result of 0.03 mg/L was measured in a routine sample taken on 24/1/22 at Noosa WTP bulk supply point sample tap NO22BS, exceeding the ADWG Health limit of 0.02 mg/L.	Initial investigation included a request for Seqwater to provide recent results of Bromide/Bromate testing and information on the current Noosa water treatment plant process. Resampling was carried out and a bromate result of <0.005mg/L was measured, which was confirmed by a duplicate sample tested by an external laboratory. Seqwater confirmed that there were no positive detections of Bromate at the Noosa WTP, and that all treatment process were within operating ranges. Scientific Services team investigated possible issues with the laboratory and sampling methods. Bromate samples were subcontracted to an external lab whilst investigations were completed. The investigation identified sampling inconsistency in which a non-routine sample container was used. Preventative actions included updating the laboratory procedures for preserving bromate sample integrity.
E. coli was detected in a routine sample taken on 1/3/22 at Eatons Hill Reservoir from sample tap PS20RE. The result was 1 MPN/100mL in the presence of 0.55 mg/L total chlorine and 0.04 mg/L free chlorine.	Initial investigation included an assessment of reservoir condition, any planned or unplanned works in the area and review of recent water quality results and sampling conditions. Immediate actions included resampling at the reservoir and upstream distribution sites. Investigations concluded that the recent rain event along with reservoir integrity issues contributed to the *E. coli* detection. Corrective actions included immediate filling of the reservoir to increase chlorine levels and manually dosing chlorine until SCADA controlled dosing could be commenced. Immediate works were conducted to restore reservoir integrity.
E. coli was detected in a routine sample taken on 24/5/22 at Glasshouse Mountains – Fullerton Rd Reservoir from sample tap RT14RE. The result was 15 MPN/100mL in the presence of 1.0 mg/L total chlorine and 0.9 mg/L free chlorine.	Initial investigation included assessing water quality results from upstream and downstream sampling points, any planned or unplanned works in the area and confirming sampling conditions at the time of sampling. Immediate re-sampling at the reservoir and downstream sample points was arranged and all resamples were negative for *E. coli.* An assessment of reservoir condition found a build-up of leaf and organic matter in the box gutters and inside the reservoir. Investigations concluded that reservoir integrity issues and the recent wet weather event contributed to the *E. coli* detection. Corrective actions included cleaning of the reservoir and works to seal gaps in the roof flashing and vermin meshing.
WQ event – During minor works at Dayboro LL & HL Reservoir on 21/6/22, an oily film was noticed on the surface of the	The oily film on the water surface was initially identified at Dayboro LL reservoir during minor works conducted by a contractor. A check completed on the Dayboro HL reservoir identified there was an oily film there also, and snakes were found under the hatch.

water. Snakes and evidence of vermin entry was also identified at the Dayboro HL reservoir.	Initial investigations included an assessment of recent water quality results and customer enquiries. There were no recent customer enquiries for taste or odour issues, or anomalies in water quality trends. Seqwater was contacted to confirm status of the Dayboro WTP, which confirmed the source of the oily film was not the WTP. Immediate sampling of the surface water and sample tap was conducted. The samples were tested for BTEX/TRH and PCBs which returned negative results. Total chlorine levels were measured at between 1.1 – 1.2 mg/L. Investigations concluded that the oily film likely resulted from a faulty mixer and that there was no risk to public health. The faulty mixer was removed from the reservoir and the surface water was removed and tankered to a sewage treatment plant for disposal. A general clean and dive of both the reservoirs was performed. Preventative actions included documenting and saving mixer failure method to assist with mixer maintenance and responding to associated WQ events.

Figure 1 – Number of notifications to the regulator by financial year



6. Customer complaints related to water quality

Unitywater refers to water quality complaints as water quality 'enquiries' for categorisation purposes. The majority of customer water quality enquiries received by Unitywater are typically related to dirty water. This is often due to sediment disturbance after network events (i.e. burst mains) which have an impact on water flow direction and/or velocity. Taste and odour enquiries are the other major contributor, followed by 'Other' and 'Health'. Taste and odour enquiries are often related to changes in source water quality, and/or disinfectant residual levels.

Table 3 provides a summary of the water quality enquiries received by region. Figure 2 provides a comparison with the data from previous years.

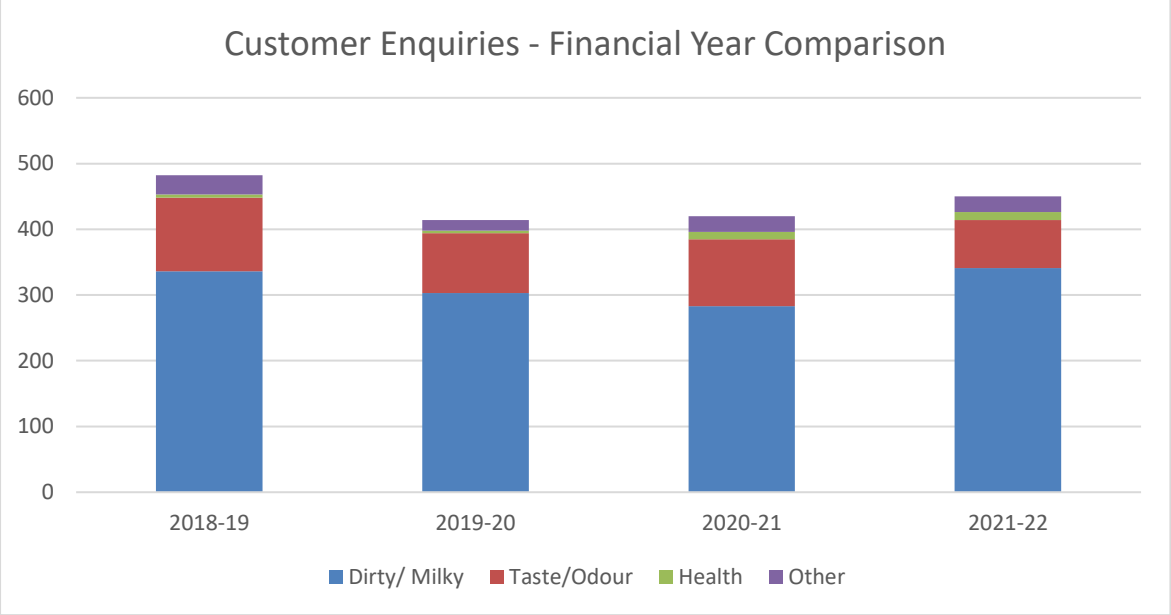
During the reporting period, Unitywater received 450 customer water quality enquiries. This is an increase from the previous financial year (420 enquiries received in 2020-21).

Due to the number of enquiries received in FY 2021-22, details of each individual case have not been included in this report. Instead, a summary of the water quality enquiry clusters is included in Table 4 (Appendix B).

Table 3 – Customer water quality enquiries by region in FY 2021-22

Water supply Region	Water Enquiry Type					Connected Population (estimated)	Per 1000 customers
	Dirty/ Milky	Taste/ Odour	Health	Other	Total		
NPI South	198	42	6	15	261	531,454	0.49
NPI North	143	31	6	9	189	470,669	0.40
Dayboro	0	0	0	0	0	2,187	0.00
Kenilworth	0	0	0	0	0	998	0.00
Total	341	73	12	24	450	1,005,309	0.45

Figure 2 – Financial year comparison of water quality enquiries



6.1. Discussion of water quality enquiries received

In 2021-22, the majority of customer water quality enquiries were related to dirty/milky water (75.8%), followed by taste and odour (16.2%), other (5.3%) and health (2.7%).

The NPI South Region received the highest number of enquiries with 261 enquires (0.38 per 1000 customers) in 2021-22. Of these, 76% were related to dirty/ milky water.

The following is a breakdown summary of each category of customer enquiries.

Health – All health enquiries were prioritised for investigation. A typical response involved a network investigation, a site visit and onsite investigation, onsite monitoring / sampling of chlorine and verbal assurance to the customer as per Unitywater procedures.

Dirty/ Milky water – Planned and unplanned works, network activity, atypical flow trends and internal plumbing issues equated for the majority of the dirty/milky water customer complaints throughout the distribution network.

The typical response to general dirty/milky enquiries was a low velocity hydrant flush in proximity to the customer's address, sampling of chlorine and verbal assurance to the customer by visiting crew members.

Taste/ Odour – Planned and unplanned works, dosing facilities / disinfection changes, network configuration (e.g. end of line / water age) and internal plumbing issues equated for the majority of the taste/odour water customer complaints throughout the distribution network.

Depending on the nature and cause of the enquiry, a typical response to taste/odour ranged from low velocity flushing, to site investigations, sampling of chlorine and/or verbal assurance to the customer.

7. Findings and recommendations of the Drinking Water Quality Management Plan Audit

No DWQMP audit was conducted or required during the 2021-22 FY. The next regulatory audit of the DWQMP is required to be completed by 5th April 2025.

8. Outcome of the DWQMP review and how issues have been addressed

In 2022 Unitywater will undertake a review of the DWQMP by 30th October. A whole of system risk assessment is being conducted and the identified actions will be included in the RMIP. The outcomes of the risk assessment and the ISO 22000 recertification audit conducted in April will inform the review of the DWQMP.

In pursuit of continual improvement, Unitywater will continue to maintain our water quality governance approach through the Safe Water Steering Group. The purpose of this steering group is to provide strategic oversight and direction in meeting Unitywater's commitment to ensuring delivery of safe drinking water to our customers, contained within Unitywater's Drinking Water Quality Policy. In support of this objective, the steering group also oversees implementation of the approved DWQMP and ISO 22000 framework.

9. Compliance to the Verification Monitoring Program

The regulator has recently requested the inclusion in this report of a discussion on any discrepancies between the number of samples required to be collected and tested and those actually taken and tested. To address this requirement, a methodology was developed to perform a reconciliation of LIMS data against the VMP, including a spreadsheet tool to

compare the datasets and highlight discrepancies. These have been highlighted in Table 4 below along with commentary on contributing factors.

Table 4 – Compliance to the Verification Monitoring Program

Region	Scheme	Expected/ Actual number of results (%)	Comments
Northern Grid	Caloundra	102.3%	- Routine samples not collected due to no site access. - Increased testing of alkalinity and metals (which was not initially accounted for in the VMP) due to configuration of laboratory test suites to allow calculation of CCPP.
	Maleny	101.4%	See 'All Schemes'
	Maroochy North	98.6%	- Routine samples not collected due to no site access.
	Maroochy South	97.5%	- Routine samples not collected due to no site access or no flow at sample tap.
	Noosa	96.8%	- Reservoir unable to be sampled ongoing due to no flow at sample tap. Sampling frequency increased at adjacent sites to assist monitoring. - Two THMs tests missed due to laboratory error. - Routine samples not collected due to no flow at sample tap or no access. - Reservoir isolated for maintenance.
	Railway Towns	109%	- Microbiology sample missed due to LIMS registration error. - Routine samples not collected due to no flow at sample tap or no site access. - Increased testing of alkalinity and metals (which was not initially accounted for in the VMP) due to configuration of laboratory test suites to allow calculation of CCPP.
Southern Grid	Bribie Island	94.0%	- Reservoir offline for planned works. Sampling frequency increased at adjacent sites to assist monitoring. - Routine samples not collected due to sample tap issue. - Discrepancy in number of *E. coli* samples due to laboratory registration error.
	Caboolture	97.7%	- Reservoir offline for planned works. Testing frequency increased at adjacent site to assist monitoring. - Routine sample not collected due to no flow at sample tap.
	Pine Rivers North	97.9%	See 'All Schemes'
	Pine Rivers South	107.4%	- Sampling frequency increased at sites to assist water quality monitoring. - Reservoir offline for planned works. - Routine samples not collected due to no site access.
	Redcliffe	95.0%	- Distribution site inaccessible due to construction. Sampling frequency increased at adjacent site to assist monitoring.

			- Routine samples not collected due to no flow at sample tap.
	Woodford	99.9%	Routine sample not collected due to no site access.
Dayboro	Dayboro	98.0%	Routine sample not collected due to road works.
Kenilworth	Kenilworth	90.0%	Distribution site unable to be sampled; incorrectly included in VMP.
Total	All schemes	99.7%	- Fortnightly sites were sampled at a frequency of 24 samples/ year due to a scheduling discrepancy. - Monochloramine tests missed for a period of 4 months due to laboratory issues and was not notified to the WQ team. - Ca, Mg, Hardness and Alkalinity testing not accounted for in the VMP at 50 sites which allows calculation of CCPP. - 11 reservoir sites had increased testing of Fe, Mn and Al due to configuration of laboratory testing suites.

Appendix A – 2021-22 Drinking Water Quality Performance Report

This report is uploaded to the Unitywater webpage for customer access. Please click the link below:

https://www.unitywater.com/about-us/our-business/water-quality/water-quality-testing-and-reports

Appendix B – Water quality enquiry cluster investigation summary

Event Number	Event Date	Trigger Description	Dirty / Milky	Taste / Odour	Health	Other	Investigation commentary	Corrective action undertaken
1211	17/07/2022	Any WQ Enquiry: 4 in 24 hours, single DMA	4				Due to planned works; PTW70329 – network drop tests. It was the sudden restoration of water supply at scouring velocities (+20L/s) that resulted in turbulence in the mains	Reactive flushing was undertaken to restore water quality
1212	30/07/2022	Any WQ Enquiry: 4 in 24 hours, single DMA	4				Due to localized network activity; contractors accessing the water network for new development / turf works on Raaen Rd stirring up sediment in the mains	Reactive flushing was undertaken to restore water quality
1213	6/08/2022	Any WQ Enquiry: 4 in 24 hours, single DMA	4				Due to planned works; PTW67208 - hydrant inspections.	Reactive flushing was undertaken to restore water quality. PNI asked to review the permit.
1214 to 1216	2/09/2021	Any WQ Enquiry: 3 in 12 hours, single DMA	8				Due to planned works; PTW71212 - 2 x 200mm inline water connections. Recharging of the new mains as part of the connections is likely to have created the initial turbulence.	Extensive reactive flushing was undertaken to restore water quality
1217	24/09/2021	Any WQ Enquiry: 6 in 24 hours, WQ Report	7				Due to planned works – PTW71075. This work resulted in the isolation of a ~2km stretch of 450mm truck water main that supplies out to Ningi, Beachmere and Bribie Island. As there were no air valves in this isolated section of main, upon re-pressurization air trapped in the pipe was forced into the water body creating the milky / cloudy appearance	After determining the cause and due to the widespread nature of this event, reactive flushing was not undertaken. Instead communications were passed onto our Contact Centre, Control Room and Media teams to provide customers with the relevant information – see attached – and the network through demand has resolved the issue accordingly.

1218 - 2019	25/09/2021	Any WQ Enquiry: 4 in 24 hours, single DMA	9				Due to planned works – PTW71856; reactive repair of the Kremzow Rd 660mm TWM. This work required a number of rezones in order to maintain water supply to our customers – one of these rezones being for DMA10P. Boundary valves were opened to supply DMA10P off DMA01P with the reversal of flow creating turbulence / dirty water	Reactive flushing was undertaken to restore water quality
1220	29/09/2022	Any WQ Enquiry: 6 in 24 hours, WQ Report	4				Due to planned works – PTW71399 / WO7854848; hydrant repair. Whilst it is likely that the rate at which the main was recharged ultimately created the initial turbulence / dirty water reported by both properties – one	Reactive flushing was initially undertaken to restore water quality.
1221 to 1225	6/11/2022	Any WQ Enquiry: 4 in 24 hours, single DMA	13				Due to planned works PTW72515 (shut for Seqwater flow meter replacement) & PTW72235 (re-zone associated with Unitywater Capital Works project). This work resulted likely caused cloudy water to permeate the DMA due to exposure of air pockets within the network, and possible reverse flow of many mains within the DMA.	Due to planned works PTW72515 (shut for Seqwater flow meter replacement) & PTW72235 (re-zone associated with Unitywater Capital Works project). This work resulted likely caused cloudy water to permeate the DMA due to exposure of air pockets within the network, and possible reverse flow of many mains within the DMA.
1226 to 1228	4/12/2022	Any WQ Enquiry: 6 in 24 hours, WQ Report	20				Planned works under PTW 68158 caused a downstream main break on Jones Rd, Buderim. These works introduced air to the mains, increasing turbidity and stirring up sediment causing dirty/milky water to permeate the DMA.	The mains break was repaired and reactive flushing was undertaken within the DMA to clear cloudy water. Customers were contacted and advised of network flushing.
1229	15/12/2022	Any WQ Enquiry: 3 in 12 hours, single DMA	3				Mains break on Judy St, Golden Beach caused a number of properties to experience dirty and/or cloudy water.	The mains break was repaired and reactive flushing was undertaken within the DMA. Customers were followed up with to ensure water now clear.

1230							Not created by the system.	
1231	4/01/2022	Health, Taste or Odour: 2 in 10 hours, single DMA		2			Due to systems error – duplication of singular Service Request / Order	Singular customer complaint was investigated / resolved as per typical process.
1232 - 1233	3/04/2022	Any WQ Enquiry: 3 in 12 hours, single DMA	5				Failed PTW. Entrapped air while recharging a broken main	Reactive flushing was undertaken to restore water quality
1234 - 1235	6/06/2022	Any WQ Enquiry: 4 in 24 hours, single DMA	4				Broken main in the DMA. High velocities scoured the pipe, causing dirty water.	Reactive flushing was undertaken to restore water quality

End of report.