WESTERN DOWNS REGIONAL COUNCIL

Drinking Water Quality Management Plan (DWQMP)

Annual Report 2023/24

OUR COMMUNITIES | OUR FUTURE

Drinking Water Quality Management Plan Report

Western Downs Regional Council

SPID: 480

Details	Information
SPID	480
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Water Supply Schemes	Bell Chinchilla Condamine Dalby Jandowae Miles Tara Wandoan Warra

This report has been prepared following the Drinking Water Quality Management Plan Report Guidance Notes.

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1 Introduction

This is the Drinking Water Quality Management Plant (DWQMP) report for Western Downs Regional Council (WDRC) for the year 2023 - 2024.

WDRC is a registered service provider with Service Provider Identification Number - SPID number 480.

WDRC is operating under an approved DWQMP to ensure consistent supply of safe quality drinking water to protect public health. This is done through the proactive identification and minimization of public health related risks associated with drinking water.

This DWQMP report includes:

- The summary of the schemes managed under the DWQMP
- The programs monitored through the operation of the DWQMP
    - Process Review Program - Summary
    - Water Quality Review Data - Summary
    - Reservoir Inspection
    - Customer Complaints Review - including dirty water complaints
    - Risk Management Improvement Program
- Verification Monitoring through the DWQMP
    - Water Quality Information and Summary
    - Compliance with Annual E. coli Rolling Annual Value
    - Incidents reported to the Regulator
- DWQMP outcomes
    - DWQMP Review
    - DWQMP Audit

This report is submitted to the Regulator to fulfil our regulator requirement and is also made available to our customers through our website, www.wdrc.qld.gov.au or for inspection upon request at Council offices.

Click or tap here to enter text.

2 Summary of scheme/s operated

The Western Downs Regional Council (WDRC) operates nine drinking water supplies within an area of 38,000 square kilometres.

During 2023 - 2024 WDRC supplied 3531.55ML of potable water to 11 299 connections and maintained over 411.35km of reticulation mains.

WDRC's drinking water schemes utilise a range of different sources and infrastructure. Individual plants source their raw water from bores, dams and/or river systems. Treatment processes vary from plant to plant; region wide they include clarification, filtration and/or reverse osmosis desalination.

All networks are pressurised on demand by pumping stations and/or high lift towers.

Water is disinfected with chlorine before entering WDRC's reticulation networks.

Individual consumption is metered for all customers.

Table 2-1 - Summary of Schemes

Scheme	Water Source	Treatment processes	Treatment capacity	Length of Mains (km)	Towns Supplied	Population	Connections
Bell	Surface water - Koondaii Dam Ground water - Racecourse Bore Eastplain Bores consisting of Koondaii Bore x 2 Warmga Bore Cattle creek Bore	**Bell WTP -** Aeration, flocculation, sedimentation, filtration, carbon dosing	**0.35ML/day**	**9.6**	**Bell**	**246**	**193**
Chinchilla	Surface water - Chinchilla Weir (Condamine River)	**Chinchilla WTP -** Process includes, potassium permanganate dosing flocculation, clarification, ultrafiltration, UV sterilisation and activated carbon and fluoridation. *Activated carbon is only used during periods of blue-green algae outbreaks in the storage when pesticides are detected or other water quality issues for which carbon usage may be beneficial*	**5.04 ML/day**	**99.9**	**Chinchilla**	**6,292**	**3,206**
Condamine	Surface Water - Condamine Weir	**Condamine WTP -** Activated carbon *(if needed)*, flocculation, clarification, filtration, disinfection.	**0.5 ML/day**	**6.8**	**Condamine**	**294**	**124**
Dalby	Surface Water - Loudoun Weir on Condamine River Ground water - Alluvial 'A' Bores Alluvial 'B' Bores	**Dalby Filtration plant-** Rapid mix, flocculation/coagulation, sedimentation, activated carbon, filtration, disinfection, fluoridation. Alluvial 'A'-disinfection and fluoridation. **RO desalination -** UV, multimedia filtration, cartridge filtration, 2 stage reverse osmosis, air stripping, blending/stabilisation/ pH adjustment, disinfection, fluoridation. **RO concentrate reprocessing -**	**10.8 ML/day**	**181.2**	**Dalby**	**12,758**	**5,452**

Scheme	Water Source	Treatment processes	Treatment capacity	Length of Mains (km)	Towns Supplied	Population	Connections
		Cartridge filtration, single stage RO, air stripping, blending, disinfection, fluoridation.					
Jandowae	Surface water - Jandowae Dams	**Jandowae WTP -** Aeration, flocculation, clarification, filtration, pH adjustment	**0.96 ML/day**	**27.4**	**Jandowae**	**1,000**	**487**
	Groundwater - Jandowae Bores	Bore water is not treated apart from aeration and disinfection prior to supply					
Miles	Surface water - Gil Weir on Dogwood creek	**Miles Filtration Plant -** Aeration, flocculation, clarification, filtration, fluoridation	**1.6 ML/day**	**38.6**	**Miles**	**1,874**	**911**
	Groundwater - Miles Bore	**Miles RO plant -** Cooling, UV, Media Filtration, Cartridge Filtration, 2 stage reverse osmosis, blending, pH adjustment, stabilisation, disinfection	**417kL/day**				
Tara	Surface water - Tara Lagoons	**Tara WTP A -** Flocculation, clarification, Filtration	**500kL/day**	**23.4**	**Tara**	**728**	**482**
	Groundwater - Tara Bores 1 & 2	**Tara RO Plant** - Pre-treatment - chlorination, UV, Ultrafiltration, 2 stage RO, blending, pH adjustment, stabilisation	**360kL/day**				
Wandoan	Groundwater - Wandoan Bores 1 & 2	**Train 1** Cooling, Aeration, flocculation, inclined plate sedimentation, filtration, and disinfection. *(Currently mothballed).* **Train 2** Cooling, Aeration, KMNO4, BIRM media, and disinfection. *(Currently mothballed).* **Train 3** Cooling, Aeration, Oxidation, flocculation inclined plate sedimentation filtration and disinfection.	**1.0 ML/day**	**20.4**	**Wandoan**	**666**	**373**
Warra	Surface Water - Warra Weir and off stream storage (Warra Dam)	**Warra WTP** Ultrafiltration, pre-dosing with alum, potassium permanganate or powdered activated carbon is possible.	**200kl/day**	**3.9**	**Warra**	**180**	**71**

3 DWQMP implementation

The actions undertaken to implement the DWQMP are summarised below.

The implementation of the Drinking Water Quality Management Plan (DWQMP) during the 2023 - 2024, is divided into the following categories:

1. **Process Review Program**
2. **Reservoir Inspection**
3. **Water Quality Review Data**
4. **Customer Complaints Review - including dirty water complaints**
5. **Risk Management Improvement Program**

The following information highlights the work undertaken within 2023 - 2024 for each of the mentioned programs.

3.1 Process Review Program

36 process reviews were performed during 2023 - 2024.

The purpose of the reviews was either Routine or Special.

The reviews were conducted by a review team generally lead by Utilities Treatment Principal and were completed via a plant visit or online.

The components of the Process Reviews are found below:

- Internal Testing Data
- Chemical Usage Records
- Maintenance Records
- Network Testing
- Standard Chemical Analysis
- Microbiological Reports
- Operators Logbook
- Found Safety Issues
- Flow and Power Logs
- Calibration Logs
- Online Process Log

3.2 Water Quality Data Program

27 water quality process reviews were performed during 2023 - 2024.

The reviews evaluated the weekly water quality for the drinking water schemes. Results of pH; Conductivity; Free Residual Chlorine and Internal E.coli results was included in the review; along with commentary. The reviews are emailed to the Treatment Coordinators following the completion of the review.

3.3 Reservoir Inspection Program

Table 3-1 - Reservoir Inspection Program

Scheme	Water Storage Type	Inspection Program - 2023-2024
BELL	On Ground storage	Contractor FTA inspection clean 2024
	Fibreglass tanks x 3	In-House Inspection
CHINCHILLA	Clear Water Tank	In-House clean & Inspection July 2023 Contractor FTA inspection clean 2024
	Contact tank	In-House clean & Inspection July 2023 Contractor FTA inspection clean 2024
	Treated Water Tank	In-House clean & Inspection July 2023 Contractor FTA inspection clean 2024
	Low Level Riverdell estate park A	In-House clean & Inspection July 2023 Contractor FTA inspection clean 2024
	Low Level Reservoir Osbourne street	In-House clean & Inspection July 2023 Contractor FTA inspection clean 2024
	Treated Water Low Level Small Reservoirs Colamba Street	Contractor FTA inspection clean 2024
	Treated Water Low Level Large Reservoirs Colamba Street	Contractor FTA inspection clean 2024
	High Level Tower	Contractor FTA inspection clean 2024
CONDAMINE	Low Level Large Reservoir 1	In-House Clean & inspection September 2023 Contractor FTA inspection clean 2024
	Low Level Reservoir Small 2	In-House clean & inspection July 2023 Contractor FTA inspection clean 2024
	Large Low level Small reservoir 3	In-House clean & inspection September 2023 Contractor FTA inspection clean 2024
DALBY	Clear Water Tank	Clean & Inspection 25/06/2023 Clean & Inspection 25/06/2024
	Low Level Reservoir	Contractor FTA inspection clean 2024
	Low Large Level Reservoirs	Contractor FTA inspection clean 2024
	High Level Tower Owen Street	In-House clean & inspection August 2023 Contractor FTA inspection clean 2024
	High Level Towers Condamine Street	Contractor FTA inspection clean 2024
JANDOWAE	Low Level Reservoirs	Contractor FTA inspection clean 2024
	High Level Tower	Contractor FTA inspection clean 2024
	Clear Water Tank Large	Cleaned and inspected July2023 Contractor FTA inspection clean 2024
MILES	Clear Water Tank	Contractor FTA inspection clean 2024
	Low Level reservoir Solar panel res	Contractor FTA inspection clean 2024
	Low Level Reservoirs	Contractor FTA inspection clean 2024
	High Level Tower	Contractor FTA inspection clean 2024
TARA	Low Level Reservoir	Internal inspection clean & inspection July 23 External Inspection December2023

Scheme	Water Storage Type	Inspection Program - 2023-2024
	High Level Tower	Contractor inspection clean 2023 Contractor FTA inspection clean 2024
WANDOAN	Low Level Reservoir small	Contractor FTA inspection clean 2024
	Low Level Large Reservoir Large	Contractor FTA inspection clean 2024
	High Level Tower	Contractor FTA inspection clean 2024
	High Level Towers Condamine Street	Contractor FTA inspection clean 2024
WARRA	Raw Water Tank	Contractor FTA inspection clean 2024
	High Level Tower	Contractor FTA inspection clean 2024

3.4 Risk Management Improvement Program

Table 3-2 - Risk management improvement program implementation status as of 30 June 2024

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
Bell	B1	Unprotected catchment, with agriculture, no recreation. No feedlots and minor septics	Extreme 25	conventional filtration	Cattle Creek does not currently have pumps, and could be used if pumps are connected to the switchboard. Target 0.25 NTU - has been a recent issue with filter media that suggest potential for failure. Backwash of filters is insufficient.	Yes	Online turbidity meter. Replace filter media.	30/06/2024	Filter Media replaced. Filter Turb monitor installed and linked to SCADA	1	Yes		Consider long term strategy for Bell regarding water source and level of treatment.
Bell	B10	Bypass operated into Low Level Reservoir	Extreme 20		Bypass is not used, but not locked out or air gapped.	Yes	Investigate if there is a pipe between valves, and air gap if decision to retain capability.	4/10/2023	Investigated & positively disconnected. Valve block to be removed.	2	Yes		
Bell	B11	Bypass operated into the clear water tank	Extreme 20	chlorine disinfection	Bypass is not used, but not locked out or air gapped. Chlorine would treat bacteria and virus, but no barrier to protozoan pathogens.	Yes	Investigate if there is a pipe between valves, and air gap if decision to retain capability.	4/10/2023	See B10 above	2	Yes		
Bell	B12	Underdose ACH	High 15	conventional filtration	Run at lower rate to have longer run times	Yes		4/10/2023	Daily Ecoli testing implemented for system when bores in use. Racecourse bore tested - ongoing	2	Yes	Consider alarm on clarifier turbidity meter/ shutdown of plant (need to resolve SCADA issues)	
Bell	B13	Overdose ACH	Extreme 25	conventional filtration	Clarifier is very large so dosing to a point that impacts performance is difficult.	No				3	No		
Bell	B14	Inadequate coagulation/flocculation	Extreme 25	conventional filtration, chlorination		No				3	No		
Bell	B15	Inadequate coagulation/flocculation	High 15	conventional filtration, automatic bleed of sludge to bring blanket down.	Typically below 1 NTU off clarifier.	No				3	No		
Bell	B16	operate bores without filters	Low 3	coagulation	bore turbidity reduces through clarification process.	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
Bell	B17	recycling of protozoa	Extreme 25	There is a return line, but this is not used		No				3	No		
Bell	B18	Overdose	High 12	Not routinely used		No				3	No		
Bell	B19	Underdose	Low 3	Not routinely used		No				3	No		
Bell	B2	Unprotected catchment, with agriculture, no recreation. No feedlots and minor septics	Extreme 25	conventional filtration, chlorination	have been air locks in dosing pumps, resolved 18 months ago. No alarms on chlorination. 2 days average treated water supply. Plant flow rate is low, and difficult to catch up with demand.	Yes	Online turbidity meter. Replace filter media.	30/06/2024	Filter Media replaced. Filter Turb monitor installed and linked to SCADA	2	Yes		
Bell	B20	Overdose PAC	Low 3	Not routinely used		No				3	No		
Bell	B21	Underdose PAC	Medium 9	Not routinely used, chlorine oxidation		No				3	No		
Bell	B22	underdosing chlorine	Medium 9	set point chlorine dose single dosing pump	typically 160 mL/ hr. This is the primary disinfection step when using surface water or Koondi Creek Scheme bores.	No				3	No		
Bell	B23	Normal ops	Extreme 25	Conventional filtration, daily monitoring		Yes	Online turbidity meter. Replace filter media.	30/06/2024	See B1 above	1	Yes		Consider long term strategy for Bell regarding water source and level of treatment.
Bell	B24	Backwash	Extreme 25		backwash flow rate is too low and has led to blocking of filters.	Yes	Online turbidity meter. Replace filter media.	30/06/2024	See B1 above	1	Yes		Consider long term strategy for Bell regarding water source and level of treatment.
Bell	B25	Filter breakthrough	High 15		The turbidity off the filter does not exceed 5 NTU	No				3	No		
Bell	B26	Overdose Caustic	High 12	Not routinely used	Bores and surface water pH does not require adjustment.	No				3	No		
Bell	B27	Underdose Caustic	High 12	Not routinely used		No		4/10/2023		3	No		
Bell	B28	Filtered water above 1 NTU	Extreme 25		daily chlorine monitoring, typically multiple days treated water supply.	Yes	online turbidity meter and alarms	4/10/2023	See B1 above	2	Yes		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
Bell	B29	Underdose	Extreme 25	Single dosing pump, there are 3 dose points, and 2 dosing pumps.	second dose point used when Racecourse bores are operated	Yes	online chlorine meter and alarms in current SCADA system	30/06/2024	Some SCADA upgrades undertaken to improve performance. Chlorine monitor installed delayed due to some design difficulties. Alternative unit to be trialled.	0	Yes	Consider needs for upgrade of SCADA	Consider long term strategy for Bell regarding water source and level of treatment.
Bell	B3	rain events, iron	High 15		surface water treatment removes iron under most circumstances	No				3	No		
Bell	B30	Overdose	High 12		Chlorine pump historically ran off flow switch, and chlorine dosing did continue without plant flow. This has been resolved through different monitoring.	No				3	No		
Bell	B31		High 12	Small chlorine tank, replaced regularly sourced from Jandowae		No				3	No		
Bell	B32		High 12		HAAs are not typically a problem in this scheme with more THM production than HAAs	No				3	No		
Bell	B33	Reaction with organics in surface water	High 12	Clear water tank aerator	Only an issue with surface water treatment. Chloroform is main THM, and able to remove through stripping. Groundwater not a concern for THMs.	No				3	No		
Bell	B34	Ingress due to poor vermin proofing	High 15	Recent improvements to reservoir integrity of low level reservoir. Chlorine disinfection.	Cody Hill and Telstra Hill tanks are fully sealed.	No				3	No		
Bell	B4	Ingress via poor casing. Koondi 2	High 10	conventional filtration, chlorination		No				3	No		
Bell	B5	Ingress via poor casing. Koondi 2	Medium 6	conventional filtration		No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
Bell	B6	inherent in bores	High 15	No barrier	The surface water source is used when avalable. The TDS risk is aesthetic and is as low as reasonably practical. There is community acceptance of the low quality bore water.	Yes				2	Yes		Consider long term strategy for Bell regarding water source and level of treatment.
Bell	B7	If contaminated, direct supply into clear water storage, bore construction is best of Bell bores.	High 15	chlorine disinfection	Normally effective based off 5 years of E coli data	No				3	No		
Bell	B8		High 15	Used as an additional source, dilution.	1L/s - this is the only bore that can be used in conjunction with surface water - can use Cody Hill tanks to fill Clear water tank, but then takes several days to catch back up. Turbidity goes above 1, but no colour to community.	No				3	No		
Bell	B9	If contaminated, direct supply into clear water storage, bore construction is best of Bell bores.	High 15		Air testing of bore resulted in indications of potential surface connection.	Yes	Commence raw water E coli testing in Racecourse bore when in use.	4/10/2023	Consider moving racecourse bore into the full treatment process. Commenced, Ecoli presence confirmed	0	Yes	Consider moving racecourse bore into the full treatment process	Consider long term strategy for Bell regarding water source and level of treatment.
Chinchilla	Ch1	Operating as designed	Extreme 25	Full treatment plant with multiple effective barriers	A large proportion of the supply can be processed CSG water - can be the majority.	No				3	No		
Chinchilla	Ch10	Underdose Alum	Extreme 25	duty standby pumps, flow paced dosing, flow alarms, auto changeover. UF and UV.	Raw water turbidity meter. Typically aiming for turbidity of ~ 2NTU from clarified water. Alarm to operator when process fails - 25 NTU. Membranes can handle turbidity up to 100 NTU.	No				3	No		
Chinchilla	Ch11	Overdose Alum	High 12	duty standby pumps, flow paced dosing, flow alarms, auto	Standard chemical analysis for aluminium. Have been 4 elevated	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
				changeover. UF and UV.	results in last 5 years of data.								
Chinchilla	Ch12	Underdose Alkali	High 12	duty standby pumps, flow paced dosing, flow alarms, auto changeover.	not required at all times. In dirty water with high alum dose this process is required.	No				3	No		
Chinchilla	Ch13	Overdose Alkali	High 12	duty standby pumps, flow paced dosing, flow alarms, auto changeover.	not required at all times, can increase chlorine demand if underdosed	No				3	No		
Chinchilla	Ch14	Underdose Alkali	High 12	duty standby pumps, flow paced dosing, flow alarms, auto changeover.	Dosing to bring pH up to 7- 7.5	No				3	No		
Chinchilla	Ch15	Overdose Alkali	High 12	duty standby pumps, flow paced dosing, flow alarms, auto changeover.	Dosing to bring pH up to 7- 7.5	Yes	Add shutdown levels at 6.5 and 8.5			2	Yes		
Chinchilla	Ch16	coagulated water to enter clarified tank	Extreme 25	Only used if low turbidity water in flocculation tank (< 15 NTU), UF and UV	Clarifier has been bypassed for 2 weeks in 5 years of operation. No impact on process. Can be used for maintenance of lamella clarifier.	No				3	No		
Chinchilla	Ch17	Backwash	Extreme 25	CCP for MIT and turbidity, UV and chlorine	There have been turbidity issues related to Mn (e.g. when MIT has passed). Turbidity is typically very low.	No				3	No		
Chinchilla	Ch18	Filter breakthrough	High 15	CCP for MIT and turbidity	There have been turbidity issues related to Mn (e.g. when MIT has passed). Turbidity is typically very low.	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
Chinchilla	Ch19	Filter breakthrough	Extreme 25	CCP for MIT and turbidity, UV	There have been turbidity issues related to Mn (e.g. when MIT has passed). Turbidity is typically very low. Water backwash typically every 30 minutes. Daily maintenance clean either citric, or hypo. Recovery clean every month or as required. Can see slight increase in hypo after wash, but dilution in clear water tank means no impact downstream. No issues identified with acid cleans. No additional hazards as a result.	No				3	No		
Chinchilla	Ch2	Operating as designed	Extreme 25	Full treatment plant with multiple effective barriers		No				3	No		
Chinchilla	Ch20	Underdose	Extreme 25	UF and UV. Duty standby operation, but not used as duty assist	UVT is typically in the 80% range, but the plant design assumed UVT of 95%. Citric acid clean as required. There have been periodic air locks in UV systems resulting in UV getting hotter, but this does not cause operational issues.	Yes	discuss with supplier around adjusting the control system to have critical limit of 22 mJ/cm2 and then implement CCP			2	Yes		
Chinchilla	Ch21	Filtered water above 1 NTU	Extreme 25	Duty standby, flow paced, alarms		No				3	No		
Chinchilla	Ch22	Underdose	Extreme 25	Duty standby, flow paced, alarms, UF and UV	CPE based off a 1 hour detention time in the clear water tank only - there is additional Ct in the treated water tank, rising main and reticulation reservoir. There is a dedicated rising main to the	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
					Colamba St Reservoir, so increased dosing at the plant does not result in a risk of high chlorine to customers unless supplying direct from treatment plant.								
Chinchilla	Ch23	Overdose	High 12	Duty standby, flow paced, alarms	Use the hypochlorous acid monitoring at the plant, daily monitoring at Colamba St Reservoir for free chlorine	No				3	No		
Chinchilla	Ch24		High 12	turnover of stock	temperature controlled storage, high turnover of chlorine stocks, results are below 0.5 mg/L since commissioning new plant	No				3	No		
Chinchilla	Ch25	Reaction with organics	High 12	Enhanced coagulation, UF, permanganate oxidation	Have been issues with THMs and HAAs are close to guideline levels. This is mostly around longer detention time areas of the reticulation. Can also be an issue if the source water has high DOC.	No				3	No		
Chinchilla	Ch26		Extreme 25	Sufficient Ct in system	Bypass is only used for maintenance	No				3	No		
Chinchilla	Ch27	Overdose Caustic	High 12		This would require the change of dosing from the end of the lamella clarifier to this location. Rarely been used, and not normal operation. Ct is met prior to this point, so does not impact disinfection. Would operate as a CCP with limits as per dosing at Lamella clarifier.	No				3	No		
Chinchilla	Ch28	Underdose Caustic	High 12		This would require the change of dosing from the end of the lamella clarifier to this location. Rarely been	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
					used, and not normal operation.								
Chinchilla	Ch29	Overdose Fluoride	High 12	flow paced, alarms, compliant dosing system	Daily testing, target 0.8 mg/L, tank size is appropriately designed to avoid overdose	No				3	No		
Chinchilla	Ch3	Operating as designed	High 15	Full treatment plant with multiple effective barriers	Manganese does break through the treatment process, and this manifests as turbidity spikes in reticulation - but minimal complaints	No				3	No		
Chinchilla	Ch30	Underdose Cal	Low 3	flow paced, duty standby	target 40mg/L hardness minimum, not required at all times	No				3	No		
Chinchilla	Ch31	Overdose CaCl	Low 3	flow paced, duty standby	500L tank maximum	No				3	No		
Chinchilla	Ch32	Ingress due to poor vermin proofing	High 15	Roofed and vermin proof tank, chlorine	Regular inspections	No				3	No		
Chinchilla	Ch33	Reduced Ct	Extreme 25		Only used for maintenance - cannot bypass both clearwater and treated water tank as one is required as a source of backwash water.	No				3	No		
Chinchilla	Ch34	Laboratory equipment	Extreme 20		Suitably resourced laboratory	No				3	No		
Chinchilla	Ch35	Reliance on control systems to control plant functions	Extreme 20	Calibration of instruments ~ monthly. Annual maintenance by Hach. Multiple treatment barriers.	online pH meters are lower reliability. Handheld turbidity meters are not accurate at very low turbidity. Chlorine meter measures hypochlorous acid, which is not directly related to chlorine dose (pH dependent)	Yes	link to system wide process for improvements in instrument reliability/ calibration/ maintenance			2	Yes		
Chinchilla	Ch36	Overdose chlorine	High 12	Sizing of the system, pump programmed appropriately, regularly monitoring. Riverdell is	Dose - aiming for 1 mg/L.	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
				an un-stabilised calcium hypochlorite dosing system - ~2 tablets per week									
Chinchilla	Ch37	Underdose chlorine	High 15	Treated water from treatment plant has effective disinfection,	has been one E coli incident after Industrial Park in past 5 years with low chlorine.	Yes	Consider method to increase reliability, including safe operator access	4/10/2023	Riverdell has been reviewed. Current status retained	2	Yes		
Chinchilla	Ch38	Breakdown of hypochlorite stock	High 12	Industrial Park uses hypo, this is the second dose, so more of a risk after this point		Yes	Consider replacing sodium hypochlorite with tablets at Industrial Park to mitigate chlorate risk. Alternatively, could potentially dilute hypo stock/ cool etc.			2	Yes		
Chinchilla	Ch39	Loss of PLC	High 15	Backup PLC program offsite, PLC processor as spare, commonality across different treatment plants, 3 days of water supply	This plant is not capable of running in manual mode, and likely to take more than 1 day to resolve. Would require demand management.	Yes	Review current spares and purchase additional critical spares that are identified as required.	30/06/2024	Some parts purchased. Ongoing task. Staff SCADA technician hired.	2	Yes		
Chinchilla	Ch4	Access to raw water pumps restricted	High 15	Easement and routine maintenance of pumps. 3 raw water pumps. 3 days supply of treated water.	Current issue where landowner is limiting Council access down easement to raw water pumps. This has limited maintenance on pumps, and increases the risk of loss of supply.	No				3	No		
Chinchilla	Ch5	recycling of protozoa	Extreme 25	Supernatant is returned at preprogramed rate (maximum 10%), quality of return is not a control point. Coagulation/	Supernatant turbidity is typically lower than the surface water supply. There is further treatment of the backwash water (coagulation and clarifier)	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
				UF / UV after this point.									
Chinchilla	Ch6	Underdose PAC	Medium 9	Permanganate oxidation, PAC, and chlorine oxidation	1991 there was a significant algal bloom, initiated carbon dosing, but no toxins detected.	No				3	No		
Chinchilla	Ch7	Underdose PAC	Medium 9	PAC only added when there is a known challenge		No				3	No		
Chinchilla	Ch8	Potassium Permanganate overdosing	High 12	Duty standby pumps, flow alarms, auto changeover.	DPD1 used to test for permanganate pre-UV, dose rate adjusted to result in no free permanganate. Dosing can be either at head of plant or into the clarifier. Into clarifier is the most common mode of operation. Oxidation tank can be used to extend contact time.	No				3	No		
Chinchilla	Ch9	Potassium Permanganate underdosing	Medium 6	Duty standby pumps, flow alarms, auto changeover.	Online monitoring of turbidity leaving plant and turbidity monitoring in reticulation to confirm all Mn oxidised in treatment	No				3	No		
Condamine	Co1	Normal river conditions, and plant running within normal limits	Extreme 25	Conventional filtration and chlorination	Plant is normally operated when manned (operator in transit or undertaking retic testing), and turned off when not attended.	Yes	See individual actions for each process			2	Yes		
Condamine	Co10	Overdose Alkali	High 12	Conventional filtration	Only required if raw pH is low, single dosing pump, stop start with plant daily monitoring - grab sample.	No				3	No		
Condamine	Co11	Filter breakthrough	Extreme 25	Conventional filtration, daily monitoring, CCP.	Daily monitoring, plant manned while operating at most times.	Yes	Turbidity meter after filter, commence UVT monitoring (information gathering)	30/06/2024	UVT monitoring completed. Filter monitoring equipment purchased awaiting installation.	0	Yes	identify action required after analysing data	Consider further augmentation if filter performance is unable to manage risk.

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
Condamine	Co12	Filter ripening	Extreme 25	Conventional filtration, daily monitoring, CCP.	Manual backwash. No filter to waste capability. 2 halves of filter backwashed separately. Stay offline for 30 minutes to allow filter to ripen. Can still have elevated turbidity for u to 30 minutes after backwash	No				3	No		
Condamine	Co13	Filter breakthrough	High 15	Conventional filtration, daily monitoring, CCP.	Daily monitoring, plant manned while operating at most times. Reticulation monitoring not above 5 NTU	No				3	No		
Condamine	Co14	Filtered water above 1 NTU	Extreme 25			No				3	No		
Condamine	Co15	Post filtration chlorination	Medium 6	Oxidation and removal on filter	Chlorine typically dosed pre-filter, but also can be dosed post filter.	No				3	No		
Condamine	Co16	Underdose	Extreme 25	Single dosing pump, daily monitoring, plant manned operation (typical)	Chlorine typically dosed pre-filter, but also can be dosed post filter. May not detect dosing line failure if occurred immediately after inspection.	Yes	Alarms on hypochlorous acid meter	30/06/2024	Investigated. Equipment purchased awaiting installation.	1	Yes	Consider free chlorine meter to implement as continual control for CCP. Develop other alarms depending on SCADA capability.	
Condamine	Co17	Overdose	High 12	Single dosing pump, daily monitoring, plant manned operation (typical)	Pump is large enough that overdose may be possible. 100L tank	Yes	Alarms on hypochlorous acid meter	4/10/2023	See Co16 above	2	Yes		
Condamine	Co18	Reaction with organics	High 12	Conventional filtration, control chlorine dose rate, (aerators - for THMs)	Aerators are effective for THMs, not for HAAs. HAAs are more of a problem in winter with lower pH and longer water age.	Yes	Consider lowering water age by using 2 reservoirs rather than 3 (low demand so no additional loss of supply risk)			1	Yes		Consider with treatment augmentation
Condamine	Co19	Ingress due to poor vermin proofing	High 15	Roofed tanks, visual inspections of reservoirs	Larger tank has shade cloth for vermin proofing. Chlorine at this location.	No				3	No		

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Condamine	Co2	Normal river conditions, and plant running within normal limits	Extreme 25	Conventional filtration and chlorination		No				3	No		
Condamine	Co3	Normal river conditions, and plant running within normal limits	High 15	Conventional filtration		No				3	No		
Condamine	Co4	Bypass operated	Extreme 20	Physically disconnected		No				3	No		
Condamine	Co5	recycling of protozoa	Extreme 25	Conventional filtration and chlorination	Normally do not return supernatant, but can return 0.5 L/s into 7L/s plant.	No				3	No		
Condamine	Co6	Underdose PAC	Medium 9		Has not been used in 15 years. Is available if required.	No				3	No		
Condamine	Co7	Underdose ACH -either change in raw water conditions, dose rate failure etc.	Extreme 25	Conventional filtration (disinfection for bacteria and virus). Clarifier turbidity monitored.	Single dosing pump. Fixed dose rate, drop tests. No raw water turbidity meter, online monitoring off the clarifier. Plant generally operated when manned. Filtration after. Severe overdose may also have a protozoan hazard that has the same mitigated risk as the underdose.	Yes	See filtration step for actions			2	Yes		
Condamine	Co8	Overdose ACH	High 12	Conventional filtration	Overdose of ACH does not result in Aluminium in treated water	No				3	No		
Condamine	Co9	Underdose Alkali	High 12	Conventional filtration	Only required if raw pH is low, single dosing pump, stop start with plant daily monitoring - grab sample.	No				3	No		
Dalby	D1	Normal operation	Extreme 25	conventional filtration	filters are capable in higher turbidity raw water of achieving lower filtered water turbidity, at low turbidity the plant can struggle (e.g. below 15-20 NTU)	Yes	Online turbidity monitoring and logging	30/06/2024	Filter turbidity monitors and SCADA logging installed.	2	Yes		
Dalby	D10	Bore bypass operated	Extreme 20	Can blend in Clear water	Bypass has been used in 2011 flood. Conductivity up to	No				3	No		

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				storage - chlorinated.	3000 uS/cm. Only used in emergency situation - twice in 12 years.								
Dalby	D11	Bore bypass operated	Extreme 20	chlorination	Clear water can be bypassed, e.g. contaminated from floodwater or off for maintenance. In this scenario, chlorine is dosed into RO2 treated water storage to ensure Ct. (5 min contact time) - 8 km rising main after this.	No				3	No		
Dalby	D12		Extreme 25		Provision to return backwash water during backwash sequence. Not currently used, but was historically used in droughts pre RO plant	No				3	No		
Dalby	D13	Underdose PAC	Medium 9		Has not been used for a number of years	No				3	No		
Dalby	D14	Underdose Alum (inadequate coagulation)	Extreme 25	dose rates from jar testing, drop tests, 2 pumps, not duty standby, manned during operation. (chlorine for bacteria and virus)	Jar tests as required, monitored for alkalinity, pH, turbidity, minimum 2 tests per day. Sight glasses through process. 1 operator on the weekend. 1 turbidity meter shared between 2 clarifiers.	Yes	establish alarm to operator from turbidity meter	30/06/2024	Online filter monitors with SCADA logging installed.	1	Yes	consider individual turbidity meters for clarifiers	
Dalby	D15	Overdose Alum	Extreme 25	dose rates from jar testing, drop tests, 2 pumps, not duty standby, manned during operation.	Jar tests as required, monitored for alkalinity, pH, turbidity, minimum 2 tests per day. Sight glasses through process. 1 operator on the weekend. 1 turbidity meter shared between 2 clarifiers.	No				3	No		
Dalby	D16	Inadequate coagulation/floc culation	High 15	Filtration after clarifier	assessed as turbidity above 5 NTU from clarifier	No				3	No		
Dalby	D17	Underdose Alkali	High 12	single dosing pump, manned plant	regular monitoring, if alum dose high, required for maintaining alkalinity	No				3	No		

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Dalby	D18	Overdose Alkali	High 12	single dosing pump, manned plant	regular monitoring, if alum dose high, required for maintaining alkalinity. Would not have ability to dose to very high pHs.	No				3	No		
Dalby	D19	Overdose permanganate	High 12		Have facility for permanganate dosing, not typically used.	No				3	No		
Dalby	D2	Normal operation	Extreme 25	conventional filtration, chlorine	Turbidity	No				3	No		
Dalby	D20	underdose permanganate	Medium 6		Have facility for permanganate dosing, not typically used.	No				3	No		
Dalby	D21	Backwash	Extreme 25		2 groups of filters (8 cells per filter) - run one group at a time. Enclosed filters.7 are filtering, and one in reverse flow. Operators can observe colour of backwashed water. Original media in filters. Sequence changes each backwash cycle.	Yes	Online filter turbidity monitoring and logging		Filter turbidity monitors and SCADA logging installed.	2	Yes		
Dalby	D22	Filter breakthrough	High 15			No				3	No		
Dalby	D23	Filter breakthrough	Extreme 25			Yes	Individual turbidity meters for each group, commence UVT monitoring (information gathering)	30/06/2024	Filter monitors installed and linked to SCADA.	0	Yes	identify action required after analysing data	Consider further augmentation if filter performance is unable to manage risk or potential replacement
Dalby	D24	Filter breakthrough	Low 3	Used to protect RO, not as a pathogen removal barrier	multimedia anthracite, sand and garnet	No				3	No		
Dalby	D25	UV dose below design	Medium 6		RO 1 currently operated in manual as there is an issue with electronic control. RO2 UV functions effectively.	Yes	Review UV operation and maintenance to ensure confidence in UV dose			2	Yes		
Dalby	D26	Breach of membrane / leaking seals	Medium 6	protected bores, UV RO	pressure and conductivity	No				3	No		

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Dalby	D27	Breach of membrane / leaking seals	High 10	protected bores, UV RO, chlorine	pressure and conductivity	No				3	No		
Dalby	D28	Filter breakthrough	Low 3			No				3	No		
Dalby	D29	incorrect blend ratio/ significant breach of membrane (e.g. RO3)	High 15	Balance of capacity	blend ratio is generally set and not changed often. Flow monitored daily. Manual control. Conductivity normally 800 - 1000 conductivity (from RO2) RO1 lower, surface water varies. Assessed against providing fair quality water.	No				3	No		
Dalby	D3	Normal operation	High 15			No				3	No		
Dalby	D30	underdose	Extreme 25	Manual monitoring, flow checks on dose line, duty pump for main dose, potential trim dosing if required. Manned plant when using surface water.	timber baffles, can be removed, and some may allow some short circuiting, but well baffled tank. 60 minutes contact time in clear water tank. 1 customer immediately after plant. 8km rising main after this point. Have been issues with gassing in lines.	Yes	chlorine meter and alarms to operators.	30/06/2024	Chlorine monitoring equipment purchased awaiting install.	2	Yes		
Dalby	D31	Filtered water above 1 NTU	Extreme 25		Some results in SWIM are elevated, but could be data entry error. No history of E coli in treated water indicating a consistent problem.	No				3	No		
Dalby	D32	Overdose	High 12	Dilution into reticulation	Hypo pump for the surface water plant is manual - can forget to turn off, and may overdose at plant. End of day checks of plant	Yes	chlorine meter and alarms to operators.	30/06/2024	See D30 above	2	Yes		
Dalby	D33	Reaction with organics	High 12	Dilution from RO plant	Surface water plant has higher risk, if at higher proportion of supply	No				3	No		

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Dalby	D34	breakdown of hypochlorite stocks	High 12	management of chlorine stocks, routine monitoring, check temperature of delivery and strength of product	9000l total storage, but operate with 6000L hypo, have emptied and cleaned tanks. Was an issue pre 2020, but recent results have all been below 0.8 mg/L	No				3	No		
Dalby	D35	Underdose Alkali	High 12	Single dosing pump, multiple samples per day	pH from 6-8 pre caustic dosing depending on water source. RO2 water, requires pH of ~8. River water alone, pH ~7.5. Bores alone has no dosing.	No				3	No		
Dalby	D36	Overdose Alkali	High 12	Single dosing pump, multiple samples per day	pH from 6-8 pre caustic dosing depending on water source. RO2 water, requires pH of ~8. River water alone, pH ~7.5. Bores alone has no dosing.	No				3	No		
Dalby	D37	Overdose Fluoride	High 12	Meets COP, daily measurements, online fluoride measurements	Day tanks, pumps sized to prevent overdose, 2% solution is dosed.	No				3	No		
Dalby	D38	Ingress due to poor vermin proofing	High 15			No				3	No		
Dalby	D39	Complex plant and less experienced operators	Extreme 20	Trained operators, trainees, mentoring	Surface plant has not historically been regularly used other than summer, and can result in low exposure of operators to this plant.	Yes		30/06/2024	WDRC Water Treatment Operators Guide developed.	2	Yes	More procedures required for this plant to support less experienced operators.	
Dalby	D4	Normal operation	High 10	chlorination	Bores 1-8 are typically 17-25m	No				3	No		
Dalby	D40	Carryover of cleaning chemicals	Medium 9	RO not permeable to these chemicals	Rinse processes after cleaning.	No				3	No		
Dalby	D5	Normal operation	Medium 6			No				3	No		
Dalby	D6	compromised bore head or casing, contamination in	High 10	Media filter/ UV / RO / chlorine	Bores 9-14 are typically 50 -83m. Design UV dose 25 mJ/cm2	No				3	No		

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		aquifer, ingress of storm or floodwater											
Dalby	D7	contamination in aquifer	Medium 6	Media filter/ UV / RO		No				3	No		
Dalby	D8	compromised bore head or casing, contamination in aquifer, ingress of storm or floodwater	High 10	chlorine, weekly bore head inspections	has been an E coli detection in Bore 8 - limited changes in turbidity and conductivity, but cannot completely rule out some connectivity. Subtle changes in this bore quality. If tests positive, taken offline until no detections. There has been a chemical detection in this bore too. Bores 1,3, 7 for Emergency use, Bore 6 abandoned.	No				3	No		
Dalby	D9	high TDS in treated water	High 15	RO		No				3	No		
Jandowae	Ja1		Extreme 25	conventional filtration		Yes	online turbidity meter required	30/06/2024	Turb monitors for filters purchased awaiting installation.	2	Yes		
Jandowae	Ja10	Underdose ACH	Extreme 25	conventional filtration, manual duty standby, turbidity meter, plant shutdown at 10 NTU.	were historical issues with alum, but ACH works far better, reducing boil ups	Yes	Reduce plant shutdown to 5 NTU, turbidity meter for filters	30/06/2024	Shutdown reduced to 5 NTU. Turb monitors for filters purchased awaiting installation.	2	Yes		
Jandowae	Ja11	Overdose ACH	High 12	conventional filtration, manual duty standby, turbidity meter, plant shutdown at 10 NTU.		No				3	No		
Jandowae	Ja12	Inadequate coagulation/flocculation	High 15	conventional filtration	Clarifier turbidity shutdown at 10 NTU	Yes	reduce plant shutdown to 5 NTU	4/10/2023	Completed. See Ja13 below	2	Yes		
Jandowae	Ja13	Underdose Alkali / pump failure, dosing line failure	High 12	single pump with spare	need to maintain at 7.5-8 pH. Dam is as low as 7.2. Operating at higher pH appears to reduce TCAAs	Yes	reduce plant shutdown to 5 NTU	4/10/2023	Turb set point reduced to 5 NTU	2	Yes		
Jandowae	Ja14	Overdose Alkali	High 12	single pump with spare	fixed dose rate	Yes	remove grate and nozzles as these			2	Yes		

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							block up, reducing flow.						
Jandowae	Ja15	Normal ops	Extreme 25	daily testing of filtered water turbidity	target <0.25	Yes	Turbidity meter with alarm and shutdown.	30/06/2024	See Ja10 above	1	Yes		Consider further augmentation if filter performance is unable to manage risk.
Jandowae	Ja16	Backwash	Extreme 25	Backwash occurs every two days, or as required based on 24 hours operation, headloss	Ripening water is diverted to dam. Backwash tank has capacity for both filters, but then limited volume to backwash.	No				3	No		
Jandowae	Ja17	Filter breakthrough	High 15	daily testing of filtered water turbidity		Yes	Turbidity meter with alarm and shutdown.	4/10/2023	See Ja15	2	Yes		
Jandowae	Ja18	Filtered water above 1 NTU	Extreme 25	daily testing of filtered water turbidity	has occurred several times	Yes	Turbidity meter with alarm and shutdown.	30/06/2024	See Ja10 above	2	Yes		
Jandowae	Ja19	Underdose / pump failed/ dosing line failure / blocked quill	Extreme 25	daily testing of chlorine after storage, 2 days of supply under most circumstances.	manual duty standby, 2 chlorine storage tanks. Minimum chlorine in reticulation is 0.2 mg/L over 5 years.	No				3	No		
Jandowae	Ja2		Extreme 25	chlorine		No				3	No		
Jandowae	Ja20	Overdose	High 12	daily testing, dilution in reservoirs	use comparator for chlorine measurements	No				3	No		
Jandowae	Ja21	breakdown of chlorine stock	High 12	Bores are emergency use only	5L stored, tested fortnightly -	Yes	Develop procedure. Remove chlorine from site once the scour lines installed for bores.			2	Yes		
Jandowae	Ja22	reaction of chlorine with organics	High 12	conventional treatment, chlorine dosing control	pH above 7.6 appears to limit HAA formation	Yes	Better management of chlorine residual	30/06/2024	Online chlorine monitored purchased awaiting installation.	2	Yes		
Jandowae	Ja23	reaction of chlorine with organics	High 12	conventional treatment, chlorine dosing control		Yes	Better management of chlorine residual	30/06/2024	Online chlorine monitored purchased awaiting installation.	1	Yes	side stream aerator	
Jandowae	Ja24	Ingress due to poor vermin proofing	High 15	Roofed and vermin proofed	operators unable to inspect clear water tank hatch. Procedure for annual	Yes	Ensure regular inspections of clear water tank.			2	Yes		

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					inspections of reservoirs. Chlorine.								
Jandowae	Ja25	Operators attend 3 plants and reactive works impact routine operations.	Extreme 20	Operators are trained and daily tasks allocated on a needs basis. If multiple plants have issues, this becomes more difficult.	Limits ability for operators to access plants and spend time to resolve issues. Operator has to get dropped at site and picked up later. 6 days a fortnight when 1 operator available due to weekend and RDOs	No				3	No		
Jandowae	Ja3		High 15			No				3	No		
Jandowae	Ja4	Bore head not fully secure	High 15	chlorination	bores rarely used - bore 2 is electrically isolated. Bores are maintained by starting once per fortnight. Chlorine system is tested. Only used if no other source is available, or major issue at treatment plant.	Yes	Designate as emergency use only- install valves to allow to run to waste for maintenance.			0	Yes	develop CCP for this dosing system specifically - need to meet CT	Consider refurbishing bores to ensure that they meet construction standards for protection.
Jandowae	Ja5	Bore head not fully secure	High 15		bores rarely used - bore 2 is electrically isolated. Not under influence of surface water.	Yes	Investigate whether there is an easement for the compound, and ability to remove stock from the vicinity.	30/06/2024	Stock removed. Some sealing works undertaken on bore 1.	1	Yes		Consider refurbishing bores to ensure that they meet construction standards for protection.
Jandowae	Ja6	Untreated supply into clear water storage	High 15	Immediate vicinity is protected, and construction is considered acceptable.	Better quality water than bores 1,2,6. Currently not connected.	No				3	No		
Jandowae	Ja7	Bore head not fully secure	High 15	chlorine and bore enter pipework in adjacent position just before a mixer, and ahead of CWT.	Rarely used to supplement supply - has not been used for ~5 years	No				3	No		
Jandowae	Ja8	recycling backwash water into the dam - no other disposal option	Extreme 25	conventional filtration		Yes	online turbidity meter required	30/06/2024	Online turbidity monitor of settled water in place. Filter monitors purchased awaiting installation	2	Yes		

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Jandowae	Ja9	Protozoa recycling	Extreme 25	conventional filtration	Sufficient evaporation in sludge lagoon that recycling not required. Would pump to dam rather than into process. Pipework disconnected to aerator.	No				3	No		
Miles	M1	Present in catchment - cattle, localised septics, landfill, recreation	Extreme 25	conventional filtration, RO plant provides base load of plant but 50:50 annualised split		Yes	turbidity meters required off the filters	30/06/2024	Turb monitors for filters purchased with some install work undertaken	1	Yes		consider whether additional treatment is required after analysing turbidity meter data
Miles	M10	Underdose Alkali	High 12	duty standby pumps, daily monitoring of pH and adjustment, pump fault alarms	required for effective coagulation	No				3	No		
Miles	M11	Overdose Alkali	High 12	duty standby pumps, daily monitoring of pH and adjustment, pump fault alarms	required for effective coagulation	No				3	No		
Miles	M12	No aeration	Medium 9	No additional controls, infrastructure operates 100% of time		No				3	No		
Miles	M13	Underdose Coagulant, (pH impacts)	Extreme 25	conventional filtration, turbidity meter on settled water, high alarm and shutdown	Shutdown at 5 NTU	Yes	Reduce alarm (high) to 2 NTU	30/06/2024	Alarms reduced to 2ntu	2	Yes		
Miles	M14	Overdose Coagulant	High 12	conventional filtration, turbidity meter on settled water, high alarm and shutdown		No				3	No		

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Miles	M15	Inadequate coagulation/flocculation	High 15	conventional filtration, turbidity meter on settled water, high alarm and shutdown	Shutdown at 5 NTU	No				3	No		
Miles	M16	Normal ops	Extreme 25	manual daily monitoring of combined filtrate	Monitor filter time since backwash, head loss and percentage of rate control valve (Head loss and rate control valve logged). Filters struggle if clarified water above 2.5 NTU due to loading.	Yes	turbidity meters required off the filters	4/10/2023	See M1 above	1	Yes		consider whether additional treatment is required after analysing turbidity meter data
Miles	M17	Backwash	Extreme 25	backwash on head loss, rate control, time, turbidity	filters run to Rocky Pond for 10-15 mins before coming back into production	Yes	turbidity meters required off the filters	4/10/2023	See M1 Above	1	Yes		consider whether additional treatment is required after analysing turbidity meter data
Miles	M18	Filter breakthrough	High 15	manual daily monitoring of combined filtrate, Often run in conjunction with RO plant		No				3	No		
Miles	M19	overdose chlorine	Low 3	Dose rate is up to 1.6 mg/L, chlorine strength, reacts with ammonia from bore - measure to ensure no free chlorine	The RO membranes could be damaged by higher chlorine, but this is monitored regularly.	No				3	No		
Miles	M2	Present in catchment - cattle, localised septics, landfill, recreation	Extreme 25	conventional filtration, chlorination RO plant provides base load of plant but 50:50 annualised split		No				3	No		
Miles	M20	overdose chlorine	High 12	Dose rate is up to 1.6 mg/L,		No				3	No		

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				chlorine strength, reacts with ammonia from bore - measure to ensure no free chlorine									
Miles	M21	cross connection from cold and hot side of heat exchanger	High 10	monitoring of cool water side of heat exchanger, including conductivity, regular maintenance , CIP for scale reduction UV in cool water side for biofouling control, rechlorinatio n of cooling water, RO.		No				3	No		
Miles	M22		Low 3	Heat exchanger used to reduce temperature to prevent damage to membranes, two heat exchangers that are able to be maintained/ descaled. Shutdown of RO on feed water temperature.	Membranes can only handle up to 40C. Typical temperature after heat exchanger is 30-35.	No				3	No		
Miles	M23	UV Failure	Medium 6	Used as a membrane protection process, not intended for protozoan LRV	intent is to prevent biofouling on the RO.	No				3	No		
Miles	M24	bore head contamination and or contamination	Medium 6	pressure monitoring of pressure filters,	process used as a process protection	No				3	No		

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		through cooling process and failure of media filters		(chlorination for bacteria and viruses downstream)									
Miles	M25	Membrane breach	Medium 6	Conductivity monitoring of RO, system pressures and flows		No				3	No		
Miles	M26	Membrane breach	High 10	Conductivity monitoring of RO, system pressures and flows, chlorination		No				3	No		
Miles	M27	RO membrane breach	High 15	Conductivity monitoring of RO, system pressures and flows, fluoride monitoring.	Alarms and shutdowns based on conductivity	No				3	No		
Miles	M28	High levels in bore water introduced into treated water stream	High 15	Fluoride in bore is variable as there are multiple aquifers that contribute to the raw supply. Maximum measured fluoride has been up to 10 mg/L.	Monitoring of fluoride daily of the treated water that includes contribution from the blend.	No				3	No		
Miles	M29	Breakthrough of membrane during CIP	Medium 9	Rinse after CIP before going into production		No				3	No		
Miles	M3	River water has high turbidity, lowest ~70, but average ~200.	High 15	conventional filtration, RO supply		No				3	No		
Miles	M30	Breakthrough of membrane	Low 3	Dosed at 0.4 mg/L, chemical is NSF compliant (check AS4020?) spectraguard 11SC	product too large to pass through membrane	No				3	No		

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Miles	M31	Overdose caustic	High 12	single pump, daily testing, flow sensor, pressure monitoring (alarms), chemical usage monitoring, pump sizing limits dose	target pH 7.7	Yes				2	Yes	pH meter to ensure effective pH for coagulation	
Miles	M32	Underdose	High 12	single pump, daily testing, flow sensor, pressure monitoring (alarms), chemical usage monitoring, pump sizing limits dose, hypochlorite dosing,	bore pH is about 6.3, pH is slightly raised with chlorination	No				3	No		
Miles	M33	Overdose	Low 3	Used as a stabilisation process.	Blending also increases stability.	No				3	No		
Miles	M34	Chlorine underdose	High 10	Chlorination normally at surface water plant (into clear water tank when RO plant running) - only used if surface water plant chlorination unavailable.	Would be operated manually - has only been used in major flooding. Require a minimum of 1 mg/L in the treated water tank for Ct.	No				3	No		
Miles	M35	Chlorine overdose	High 12	Chlorination normally at surface water plant - only used if surface water plant chlorination unavailable.	Manual operation, only used in exceptional circumstances	No				3	No		
Miles	M36	Filtered water above 1 NTU	Extreme 25	Dosing is ahead of filters, duty standby chlorine		No				3	No		

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				pumps, auto changeover, pump failure alarms									
Miles	M37	Underdose	Extreme 25	Dosing is ahead of filters, duty standby chlorine pumps, auto changeover, pump failure alarms	Dosing is ahead of filters, and this also provides manganese removal	Yes	Manual monitoring point after clear water tank	30/06/2024	Online chlorine monitor purchased awaiting installation.	1	Yes	Online monitoring of chlorine from clear water tank	
Miles	M38	Emergency bypass of the clear water tank	Extreme 25	This is physically isolated at present	Not used under normal operation. Could be reinstated if there was an issue. Ct would be achieved in treated water tank.	No				3	No		
Miles	M39	Overdose	High 12	high dose rate ahead of filters	There is high chlorine demand and there has not been an overdose	Yes	Manual monitoring point after clear water tank			1	Yes	Online monitoring of chlorine from clear water tank	
Miles	M4	runoff, floodwater, waste streams from conventional plant via settling lagoon, centrate, supernatant from sludge process, tank overflows, RO backwash water, filter to waste, chemical unloading slab runoff, birdlife	Extreme 20	Conventional filtration, normally blended with raw water, but can be used as sole source, chlorine disinfection		No				3	No		
Miles	M40	Reaction with organics	High 12	This occurs at this plant, but managed by blending with RO water, or use RO plant alone	high chlorine dose rates at surface water plant, chloroform is main THM	No				3	No		
Miles	M41	Breakdown of hypochlorite stocks	High 12	Single storage tank, but deliveries every 2 weeks, tanks	cleaning of tanks as required	Yes				2	Yes	Consider second chlorine tank to allow better turnover of stocks	

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				protected from sun,									
Miles	M42	underdose	Low 3	Currently no dosing	This is a regulatory issue under the Fluoridation Act, no public health risk	Yes				2	Yes	Discuss with council the option to remove fluoride dosing as recommended by PHU.	
Miles	M43	Overdose	High 12	Fluoride control is good at surface water plant	Blend with RO water is an issue as the bore fluoride changes with pumping time. As there is a blend with raw water for stabilisation, this impacts fluoride from RO plant - the ratio of surface water to RO plant is also problematic. Fluoride dosing has been offline for several years.	Yes				2	Yes	Discuss with council the option to remove fluoride dosing as recommended by PHU.	
Miles	M44	Ingress due to poor vermin proofing	High 15	Regular reservoir inspections, mesh screens, sealed hatches, chlorine		No				3	No		
Miles	M45	Reduced disinfection and Ct. if emergency bypass is operated	Extreme 25	Chlorination into clear water tank operates as normal under this scenario	Emergency Bypass - can pump directly from the clear water tank to reticulation. Has been used if there was contamination of the treated water reservoir.	Yes	Manual monitoring point after clear water tank			2	Yes		
Miles	M5	runoff, floodwater, waste streams from conventional plant via settling lagoon, centrate, supernatant from sludge process, tank overflows, RO backwash	Extreme 25	conventional filtration, RO plant provides base load of plant but 50:50 annualised split		Yes	turbidity meters required off the filters	4/10/2023	See M1 above	1	Yes		consider whether additional treatment is required after analysing turbidity meter data

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		water, filter to waste, chemical unloading slab runoff,											
Miles	M6	Contamination through bore casing or bore head	High 10	Bore is 52C, bore head is intact, regular inspections, RO, chlorine		No				3	No		
Miles	M7	Contamination through bore casing or bore head	Medium 6	Bore is 52C, bore head is intact, regular inspections, RO		No				3	No		
Miles	M8	Potassium Permanganate overdosing	High 12	Currently no permanent infrastructure - would dose from a bulkibin	Not required under normal circumstances	No				3	No		
Miles	M9	Potassium Permanganate underdosing	Medium 9	any oxidation is from chlorine		No				3	No		
Tara	T1	stormwater, potential sewer overflows, campers, fishing, swimming	Extreme 25	Surface water plant operated as peak load. Turbidity meter shuts down plant at 0.3 NTU.		Yes	Online settled and filtered water turbidity monitors with logging to be installed	30/06/2024	Settled and filtered water turbidity monitors installed and linked to SCADA.	2	Yes		
Tara	T10	Overdose PAC	Low 3	Not currently used, but can be reinstated.		No				3	No		
Tara	T11	Underdose PAC	Medium 9	Not currently used, but can be reinstated.	Have not used for 15 years.	No				3	No		
Tara	T12	Overdose KMnO4	High 12	Not currently used, but can be reinstated.	Have not used for 15 years.	No				3	No		
Tara	T13	Underdose KMNO4	Medium 6	Not currently used, but can be reinstated.		No				3	No		
Tara	T14	Underdose Magnasol 589	Extreme 25	conventional filtration	daily monitoring	Yes	Turbidity meter required for clarifier. Consider moving filtered water turbidity meter and replacing	4/10/2023	Unit of different style on trial in clarifier	2	Yes		

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							filter meter with higher quality meter.						
Tara	T15	Overdosing Magnasol 589	Extreme 25	conventional filtration	daily monitoring	No				3	No		
Tara	T16	Underdose 8182 floc aid	Extreme 25	conventional filtration	daily monitoring	No				3	No		
Tara	T17	overdose 8182 floc aid	Extreme 25	conventional filtration	daily monitoring - turns water white and blocks filters.	No				3	No		
Tara	T18	Magnasol as filter aid	Extreme 25	single dosing pump, dose rate 1/10th of coagulant dose.	Improves filter performance and backwash ripening	No				3	No		
Tara	T19	Overdose or underdose Magnasol as filter aid	Extreme 25	single dosing pump, dose rate 1/10th of coagulant dose.	0.3 NTU shutdown off filter.	No				3	No		
Tara	T2	stormwater, potential sewer overflows, campers, fishing, swimming	Extreme 25	conventional filtration, chlorine disinfection prior to filter		No				3	No		
Tara	T20	Inadequate coagulation/flocculation	Extreme 25	Conventional filtration, chlorine		Yes	Turbidity meter required for clarifier. Consider moving filtered water turbidity meter and replacing filter meter with higher quality meter.	4/10/2023	See T14 above	2	Yes		
Tara	T21	Inadequate coagulation/flocculation	High 15	conventional filtration		No				3	No		
Tara	T22	Normal ops	Extreme 25	Filtered water turbidity shutdown 0.3 NTU		No				3	No		
Tara	T23	Backwash	Extreme 25	Filtered water turbidity shutdown 0.3 NTU	backwash every 24 hours operation, or turbidity. Magnasol dosing onto filter as filter aid has improved ripening. Ripening to waste.	No				3	No		
Tara	T24	Filter breakthrough	High 15	Filtered water turbidity shutdown 0.3 NTU		No				3	No		

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Tara	T25	Manganese breakthrough	Medium 6	Chlorination location ahead of filter	Low levels of Mn and Iron are oxidised and removed when dosing chlorine ahead of filters.	No				3	No		
Tara	T26	No longer in use	Medium 6	Not used - was installed for prevention of fouling of RO membranes, not LRVs for pathogen removal.		No				3	No		
Tara	T27	UF membrane damage	Low 3	Cooling tanks are used continually	UF temperature tolerance is 40C	No				3	No		
Tara	T28	Prechlorination	Medium 5	flow paced chlorine dose 1-2 mg/L total chlorine monitored. Daily grab samples. Dosing pumps are alarmed.	Some naturally occurring ammonia in bores. RO for majority of supply, the blend water is not through RO, but further chlorine dosing.	No				3	No		
Tara	T29	Filter breakthrough	High 15	RO after	Use pressure differential to ensure integrity, but UF is not for LRVs	No				3	No		
Tara	T3		High 15			No				3	No		
Tara	T30	Normal ops	Medium 6			No				3	No		
Tara	T31	Backwash	High 10			No				3	No		
Tara	T32	Filter breakthrough	High 15			No				3	No		
Tara	T33	Contamination of aquifer/ borehead.	Medium 6	5 micron filter	#1 borehead has higher risk than bore 2.	No				3	No		
Tara	T34	Underdose	High 10	Single dosing pump. Set point dose. Daily monitoring.	multiple days of supply	No				3	No		
Tara	T35	Overdose	High 12	Single dosing pump. Set point dose. Daily monitoring.		No				3	No		

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Tara	T36	Degradation of hypo stock	High 12	Regular turnover of hypo tank		Yes	replacing with dual tank system, temperature controlled storage.	4/10/2023	Under construction	2	Yes		
Tara	T37	Filtered water above 1 NTU	Extreme 25			No				3	No		
Tara	T38	Underdose	Extreme 25	Chlorine dosed ahead of filter.	Chlorine monitored post reservoir. Daily sampling. Multiple days of supply in low level reservoir.	No				3	No		
Tara	T39	Overdose	High 12			No				3	No		
Tara	T4	Ingress into borehead	High 10	Chlorine		No				3	No		
Tara	T40	Dosing ahead of filter	High 12	Blending with RO water		No				3	No		
Tara	T41	Dosing ahead of filter	High 12	Blending with RO water		No				3	No		
Tara	T42	Ammonia underdose	Low 3	Assessed for completeness, but this relates to membrane damage	Not a public health risk	No				3	No		
Tara	T43	Ammonia overdose	High 10	RO removes some ammonia	Unlikely to have sufficient breakthrough into treated water	No				3	No		
Tara	T44	Antiscalant underdosing	Low 3	Assessed for completeness, but this relates to membrane damage	Not a public health risk	No				3	No		
Tara	T45	Antiscalant overdosing	Low 3	Assessed for completeness	Not a public health risk	No				3	No		
Tara	T46	Ingress due to poor vermin proofing	High 15	Regular inspection, chlorine		No				3	No		
Tara	T47	Reduced Ct	Extreme 25	3*40kL tanks in parallel	Have been used once in 15 years.	Yes				2	Yes	Develop a new procedure for use of the bypass prior to operating.	
Tara	T48	underdose	Low 3		Ca is below recommended levels	No				3	No		
Tara	T49	overdose	Low 3		scales pipework downstream of pipework	No				3	No		
Tara	T5	Ingress into borehead	Medium 6	RO (but can use for blending)		No				3	No		

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Tara	T50	Carryover of cleaning chemicals	Medium 9	RO not permeable to these chemicals	Rinse processes after cleaning.	No				3	No		
Tara	T51	Elevated pH (Tara)	Medium 9	Acid dosing at treatment plant, blending of sources		No				3	No		
Tara	T6	Fluoride above ADWG	High 15	RO		No				3	No		
Tara	T7	Fluoride above ADWG when bypassing RO	High 15	Blended with RO	Only used when LL reservoir is out of service. Has been used once in 15 years.	No				3	No		
Tara	T8	Fluoride above ADWG - running bores without RO	High 15	Monitoring of fluoride and adjusting blend ratio	Not used regularly, but has occurred in past year when surface plant was problematic. Interspersed operation of surface water plant, RO and bores to manage fluoride and maintain supply.	No				3	No		
Tara	T9	Fluoride above ADWG when blending after bag filter with RO	High 15	Blended with RO	maximum rate 1l/s	No				3	No		
Wandoan	Wan1	Contamination through bore head	High 10	Chlorine	Precipice sandstone aquifer - 52C from source	No				3	No		
Wandoan	Wan10		Medium 6		Discharged to sewer	No				3	No		
Wandoan	Wan11	Underdose ACH	High 15	Aeration, oxidation, coagulation and filtration	regular monitoring	No				3	No		
Wandoan	Wan12	Overdose ACH	High 12	Set point dosing, duty standby pumps.	Previous operator dosed much higher levels, resulting in residual Aluminium carryover.	No				3	No		
Wandoan	Wan13	Normal ops	High 15	Operated as a pressure target	Turbidity <0.25 NTU target. Combined monitoring, shutdown to be confirmed. High limit 0.8, High High 1 NTU for 600s.	No				3	No		
Wandoan	Wan14	Contamination of GAB water into the	High 15	Filtration and chlorination		No				3	No		

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		treatment process											
Wandoan	Wan15	Filter breakthrough	High 15	Filters backwashed based on time, pressure.	Issues with loss of media, due to high backwash rate. This was exacerbated with high Ultrion dose. The backwash rates are temperature dependant, cooler temperatures result in some loss of media.	Yes	Document 2 yearly filter media inspections to ensure sufficient media.			2	Yes		
Wandoan	Wan16	Filtered water above 1 NTU	High 15	Preoxidation, chlorination, daily monitoring and online monitoring	Duty standby sharing 3 pumps for 2 dosing points	No				3	No		
Wandoan	Wan17	Underdose	High 15	Preoxidation, chlorination, daily monitoring and online monitoring	Duty standby sharing 3 pumps for 2 dosing points - typically post dose duty standby.	No				3	No		
Wandoan	Wan18	Overdose	High 12	Preoxidation, chlorination, daily monitoring and online monitoring	amperometic chlorine monitoring online, incorporates pH but there are interferences . Low limit 0.5, High 5 mg/L.	No				3	No		
Wandoan	Wan19	Multiple chlorine doses when oxidising with chlorine	High 12	Multiple dose points	Single chlorine tank, managing turnover.	Yes	Reduce chlorine dose as low demand in this supply and can still maintain 0.5 mg/L in reticulation.			0	Yes	Consider using permanganate instead of chlorine oxidation	Consider changing the fluoride room to temperature controlled dual tank chlorine system.
Wandoan	Wan2	Contamination through bore head	Medium 6		Precipice sandstone aquifer - 52C from source	No				3	No		
Wandoan	Wan20	Reaction with organics in reticulation network	High 12		Have not exceeded any DBP level, only 2 results that have above 100 ug/L	No				3	No		
Wandoan	Wan21	Opportunistic contamination, and able to survive in warm water	High 12	Maintain >0.5 through most of network		No				3	No		
Wandoan	Wan22	Ingress due to poor vermin proofing	High 15	Routine inspections, vermin proofed	chlorination. Water tower has been assessed and will be decommissioned.	No				3	No		
Wandoan	Wan23	Calcium Chloride overdose	Low 3	Single pump, set point dosing.	Rarely used	No				3	No		

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Wandoan	Wan24	Calcium Chloride underdose	Low 3	Single pump, set point dosing.	Rarely used	No				3	No		
Wandoan	Wan25	Untreated water through old plant into reservoir	Extreme 20	Old plant pumps are locked out	No hydraulic path through the treatment plant into the reservoir. Valves on outlet closed	No				3	No		
Wandoan	Wan3	Cooling towers inefficient	Low 3	Cooling tower designed to reduce temperature to 35C.	Can be an issue in summer - some customer complaints. Sprays internally for aeration and can remove iron	No				3	No		
Wandoan	Wan4	Vermin ingress into cooling tower	High 15	Vermin proofing, but could get frogs through.	high temperatures in the cooling tower likely to discourage colonisation, chlorination	No				3	No		
Wandoan	Wan5	Overdose	High 12	Single pump, set point dosing.	Rarely used - was designed for oxidation rate control.	No				3	No		
Wandoan	Wan6	Underdose	High 12	Single pump, set point dosing.	Rarely used - was designed for oxidation rate control.	No				3	No		
Wandoan	Wan7	Potassium Permanganate overdosing	High 12	Duty standby dosing pumps, auto changeover	Alarms for pump failure. Set point dosing.	No				3	No		
Wandoan	Wan8	Potassium Permanganate underdosing	High 15	Duty standby dosing pumps, auto changeover	Aeration removes significant iron.	No				3	No		
Wandoan	Wan9	chlorine underdosing	High 15	Duty standby sharing 3 pumps for 2 dosing points	Aeration removes significant iron.	No				3	No		
Warra	War1	Condamine River Cat 4 catchment. Off stream storage typically has several years of supply.	Extreme 25	Fenced and locked storage, long residence time. Aeration, UF.	50 ML storage - offline, and filled opportunistically. Typically pumped when the turbidity has reduced "substantially". Pumping then for 2 days to 2 weeks. Ideally low conductivity and turbidity. Not continually pumped into the off stream storage. Would also consider capturing the last remaining water in the weir pool.	No				3	No		

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					Likely lower than Cat 4 in the off stream storage, but Cat 4 when pumping.								
Warra	War10	Overdose ACH	High 12	Single dosing pump, set point dosing. Jar test as required (e.g. on refill of off stream storage), Uf, permanganat e dosing, control of chlorine dosing.		No				3	No		
Warra	War11	Overdose ACH	High 12	This is in place at the plant but has not been required since installed.	Secondary ACH dosing available for use post clarifier and raw water tanks for contact filtration. Has not been used.	No				3	No		
Warra	War12	bypass of clarifier, resulting in insufficient reaction time and breakthrough into treated water	High 12	permanganat e dosing UF	The clarifier adds oxidation time, and allows better removal of manganese - has been used	No				3	No		
Warra	War13	Underdose PAC	Medium 9	System has been constructed and ready to implement if necessary - batch solution - pumps and tanks available. Permangana te and	Has not been used.	Yes	Develop Algal management process to trigger toxin testing.	4/10/2023	BGA plan formulation being discussed with Bligh Tanner	2	Yes		

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				chlorine oxidation.									
Warra	War14	Overdose PAC	Low 3	System has been constructed and ready to implement if necessary - batch solution - pumps and tanks available. Permanganate and chlorine oxidation.	Has not been used.	Yes	Develop Algal management process to trigger toxin testing.	4/10/2023	See War 13	2	Yes		
Warra	War15	Membrane integrity breach	Extreme 25	low level turbidity only. No MIT. Combined turbidity meter off UF racks, but typical operation is for one rack only. Pressure monitoring.	Outside in membranes, backwashed every ~40 minutes (operator adjustable). Membranes are difficult to pin, so are replaced when there is a breach. Very low range turbidity meter (laser).	Yes	Ensure that SCADA control does take the membrane offline. Review the timing after a backwash.	30/06/2024	Membranes replaced with pinnable type. Direct integrity testing equipment is beng installed on T! for testing.	1	Yes	Membranes scheduled for replacement in 23/24. The intent is to have new membranes with ability for pinning and for direct integrity testing.	
Warra	War16	Backwash	Extreme 25		backwash when the Mn has broken through results in elevated turbidity immediately after the backwash.	Yes	Review the timing after a backwash.	30/06/2024	Completed. Backwash has been totally restructured with cross flow prefferred but transmembrane wash is still avalable. Cross flow avaids dirty water on clean side of the membrane.	1	Yes	Consider ability to use a separate supply for backwash water (pre chlorine) to better reflect membrane performance.	
Warra	War17	Filter breakthrough	High 15	low level turbidity only. No MIT		No				3	No		
Warra	War18	Filtered water above 1 NTU	Extreme 25	Two dosing pumps, duty standby with auto changeover. 1 days supply at WTP, daily manual monitoring.		No				3	No		

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				Visual inspections on pumps. Alarms on pump failure/ overpressure.									
Warra	War19	Underdose - chlorine	Extreme 25	Two dosing pumps, duty standby with auto changeover. 1 days supply at WTP, daily manual monitoring. Visual inspections on pumps. Alarms on pump failure/ overpressure, low chlorine alarms.	Online meter after treated water tanks - 1.5 mg/L.	Yes	Test Yokogawa meters (other plants) to identify whether there is a permanganate interference	30/06/2024	Tested. Yokogawa hypochlorous acid meter will not detect permangante. Ultra low range Hach unit purchased but awaiting install.	1	Yes	Identify and implement solution to capture impact of permanganate interference and to ensure low chlorine critical limit is robust.	
Warra	War2	Condamine River Cat 4 catchment. Off stream storage typically has several years of supply.	Extreme 25	Fenced and locked storage, long residence time. Aeration, permanganate, UF. Chlorine	CCPs for UF and chlorine disinfection	No				3	No		
Warra	War20	Underdose chlorine - permanganate interference	Extreme 25		Permanganate carryover can interfere with the measurement of chlorine - especially an issue at low concentrations.	Yes	CCP to include consideration of the permanganate interference on the chlorine measurement.	30/06/2024	See War19 above.	1	Yes	Identify and implement solution to capture impact of permanganate interference and to ensure low chlorine critical limit is robust.	
Warra	War21	Breakdown of hypochlorite stock	High 12	Regular turnover of chlorine.	30L of storage, and replace from Jandowae as required	No				3	No		
Warra	War22	Overdose	High 12	Daily monitoring, chlorine meter after		No				3	No		

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Warra	War23	Formation of DBPs due to reactions with organic matter	High 15	Reduction of algal blooms in dams, consider DOC when filling dam, change to ACH, use of clarifier, management of water age in the reticulation network by maintaining lower levels in water tower, and ensuring effective turnover. Flushing.	Keeping dam full to limit any infiltration,	Yes	Install aeration into Tank 4 to reduce volatile THMs	30/06/2024	Tank 4 aerator installed	0	Yes	Reduce the chlorine range that is dosed with a tighter CCP requirement	Discuss with council need for significant upgrade or consideration of potable supply. As mains are replaced, reduce size of mains to increase turnover and reduce water age.
Warra	War24	Toxic algal bloom	Medium 9	permanganate and chlorine oxidation	Has not been a need to trigger toxin testing in the past.	No				3	No		
Warra	War25	Ammonia underdose	High 15	Capability, but not used		No				3	No		
Warra	War26	Ammonia overdose	High 15		Not used, but an overdose results in a bacteria/ virus hazard. Needs to be reassessed and control systems in place before operating. Requires review of DWQMP prior to operating.	No				3	No		
Warra	War27	Ingress due to poor vermin proofing	High 15	Tanks are sealed and vermin proof, and regularly inspected. Cleaned annually, chlorine dosed immediately before and monitored daily	Mn can precipitate into these tanks, so cleaning can be more frequent	No				3	No		
Warra	War28	Chlorine damage of membranes	Low 3	Membranes are tolerant of chlorine.	Can be used to reduce turbidity related to Manganese	No				3	No		

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Warra	War29	Depressurise System and backflow	High 10	Plant has been turned off due to large mains breaks - this can result in depressurisation.	customer meters at all connections, replaced every 10 years. School, pub, servo and farm supply system. If system is depressurised commence chlorine monitoring and e coli testing throughout reticulation.	Yes	Ensure documented in ERP or operators manual.			2	Yes		
Warra	War3	turbidity from catchment	High 15	Dam provides settling,	Typical turbidity from dam is < 5 NTU. (excluding manganese). Average 2 NTU.	No				3	No		
Warra	War30	Main break at Warra resulting in carry over from plant	High 12	Permanganate dosing, UF plant, recirculate plant (if low enough demand)	Mains breaks result in high demand from the plant, and this limits oxidation time, and carry over occurs. Can be up to 2 NTU in reticulation as a result.	Yes				2	Yes		There is increased mains replacement in Warra as a result of this issue. Ongoing until completed.
Warra	War4	Cyanobacterial bloom in off stream storage	High 15	Aeration, UF, Chlorine. algaecide in dam if required	Monthly sampling, 2 aerators in Dam since Jan 2022.	No				3	No		
Warra	War5	Potassium permanganate overdosing	High 12	Set point dose single pump - manual monitoring of residual permanganate. Downstream chlorination.	Aeration in dam. Raw water pumps are variable speed drives, pump on demand on raw water tank level. Clarifier allows Mn to drop out. Permanganate dosing commences with pump flow. Set point dose of permanganate. DPD1 for measurement of permanganate. Monitoring of chemical usage.	No				3	No		
Warra	War6	Potassium permanganate passes through membrane and reacts with chlorine creating	High 12	Set point dose single pump - manual monitoring of residual permanganate.	Related to high demand (e.g. main break) and lack of reaction time resulting in turbidity in reticulation.	No				3	No		

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		customer impact		Downstream chlorination.									
Warra	War7	Potassium permanganate underdosing	High 12	Set point dose single pump - manual monitoring of residual permanganate. Downstream chlorination.	DPD1 on raw and post UF skid, and post chlorination turbidity. Monitoring chemical usage.	No				3	No		
Warra	War8	Underdose ACH	Extreme 25	Single dosing pump, set point dosing. Jar test as required (e.g. on refill of off stream storage), UF.	Have used clarifier consistently for the past year. Predominantly for increasing oxidation time.	No				3	No		
Warra	War9	Underdose ACH	High 12	Single dosing pump, set point dosing. Jar test as required (e.g. on refill of off stream storage), Uf, permanganate dosing, control of chlorine dosing.		No				3	No		
Reticulation	WOS1	Ingress into reservoir through integrity breach	High 15	Residual chlorine (bacteria and virus only). Roofed reservoir with vermin proofing, some locked hatches, in locked compounds/ locked doors (Dalby Tower). Annual inspection program (internal and	Reports trigger maintenance actions	Yes	Review resourcing to ensure that actions identified in inspections and scheduled are completed in a timely manner.			2	Yes		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
				external)- many reservoirs at treatment plant - visual inspections (at plants) - daily/ weekly monthly and annual. Diving inspections (3rd party) are scheduled regularly for reservoirs that cannot be drained.									
Reticulation	WOS10	Run out of treatment chemical / spare parts etc	High 10	Interchangeability and commonality of equipment, most chemicals have several weeks of supply to 30 days supply. Online monitoring of chemical levels at Chinchilla and Wandoan, Miles RO plant, partial at some others.	Have not run out of treatment chemicals across region, but has occurred at individual plants, some lab reagents have run out. Have sourced parts from non-traditional contacts	No				3	No		
Reticulation	WOS11	Flood/ Fire	High 15	Disaster management plan, flood resilience procedures (Dalby) 3 days supply in reservoirs, trucking water	Dalby plant floods, which includes into parts of the treatment process. Checklist has been developed for pre flood preparation.	Yes	Disaster management			1	Yes		New treatment plant for Dalby - 2 ML/ day.
Reticulation	WOS12	drought causing loss of supply	High 15	demand management, diversified supply,		No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
				trucking water									
Reticulation	WOS13	Major main break/ loss of supply	High 15	Asset management, mains replacements, parallel systems in some locations.	Have changed pumping systems, high risk mains replaced, changed DI, high lift pumps changed	Yes	Ongoing mains replacements of identified mains, asset replacements as per annual budget allocation	4/10/2023	Ongoing program	0	Yes	Ongoing mains replacements of identified mains, asset replacements as per annual budget allocation	Ongoing mains replacements of identified mains, asset replacements as per annual budget allocation
Reticulation	WOS14	Citect SCADA in simulate mode. Clear SCADA alarms overridden	Extreme 20	Reliance on trained operators to manage. System integration process management.	Some functions need to have ability to simulate - currently flag when an item is simulated. Implement learnings across systems.	Yes	Implement review with SCADA integrator to improve security functionality and operability of systems	4/10/2023	Hired a staff SCADA technician to maintain and improve system	0	Yes	Ongoing	Ongoing
Reticulation	WOS15	Power outage leading to loss of supply	High 10	3 days supply in most schemes, elevated reservoirs, diesel pumps, generators, points for generators at key locations. Stakeholder engagement with electricity providers. Tankering if required.	Key power assets have been upgraded.	No				3	No		
Reticulation	WOS16	Loss of SCADA and alarms leading to adverse health outcome	Extreme 25	Operators attend plants if remote access not possible. Attend plants daily.	High service pumps are point to point with radio backup.	No				3	No		
Reticulation	WOS17	Contaminated chemicals or materials	Medium 9	Reputable suppliers, deliveries can be unmanned, tank signage, bulk	Have been some issues with fluoride quality - Code of Practice standards have changed. Incorrect chemical was added to the	No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
				tanks and day tanks	coagulant tank by supplier.								
Reticulation	WOS18	Issue with SCADA systems	Extreme 20	Separated servers for WTPs, individual logins for operators on some systems (Clear SCADA), some Citect individual logins, Offsite Backups available for all Citect systems, most Clear SCADA have offsite backups,		Yes	Implement review with SCADA integrator to improve security functionality and operability of systems	30/06/2024	Review completed. Hired inhouse SCADA technician to improve and repair system.	2	Yes		
Reticulation	WOS19	Reliance on control systems to control plant functions	Extreme 20	Calibration of instruments ~ monthly. Annual maintenance by Hach. Multiple treatment barriers.	online pH meters are lower reliability. Handheld turbidity meters are not accurate at very low turbidity. Chlorine meter measures hypochlorous acid, which is not directly related to chlorine dose (pH dependent)	Yes	link to system wide process for improvements in instrument reliability/ calibration/ maintenance	30/06/2024	Hired inhouse SCADA technician. Purchased instruments for some plants that are more user friendly in calibration.	2	Yes		
Reticulation	WOS2	Ingress into reticulation through mains break	High 15	Trained staff (on the job), tradesmen, flush after repair to visually clear, testing of chlorine (consistent with that area at 5 minute intervals),		Yes				2	Yes		Certificate 3 training in water operations - network

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
Reticulation	WOS3	Backflow from customer connection	High 15	Meters at all customer connections, RPZs at identified high risk sites, council development approvals to plumbing code, register of backflow prevention devices. (chlorine residual for bacteria and viruses)	Council issues notices to all (internal and external) owners of RPZs.	Yes				2	Yes	Undertake gap analysis of rates category versus RPZ register	
Reticulation	WOS4		High 12	Chlorine maintained above 0.5 in reticulation for majority of reticulation networks		No				3	No		
Reticulation	WOS5	Build-up in reticulation, and resolubilisation with change in oxidation state	High 12	Removal at treatment plant, cleaning of reservoirs, flushing of dead end mains	have done pigging and air scouring, but this is not routine. Warra and Chinchilla are main causes of issues.	No				3	No		
Reticulation	WOS6	Sloughing of biofilms	Medium 9	Flushing, pH control	Can occur unexpectedly	No				3	No		
Reticulation	WOS7	Reaction of chlorine with organics	High 12	Treatment plants, managing chlorine residual, manage water age in network, reservoir aerators in identified reservoirs (Bell, Warra and Condamine), Enhanced coagulation where		No				3	No		

Site	Reference	Hazardous Event	Unmitigated Risk	Control Measures in place	Comment	Improvement Required	Improvement Action Required - Immediate	Status Update Date	Status Update Comment	RMIP Score	RMIP	Improvement Action Required ~ 2 years	Improvement Action Required - Long term
				possible (Dalby and Chinchilla)									
Reticulation	WOS8	Operator makes a mistake, inadequately resourced, competing priorities, overworked, inadequate supervision, routine maintenance delayed	Extreme 20	Trained operators (or scheduled for training), contract operators are used when necessary.	Not enough operational staff to cover daily duties, and no contingency. 25% of identified positions are unfilled overall.	Yes	Increase reliance on technological solutions			0	Yes	Develop and implement staffing attraction and retention strategy, consider succession planning.	Ongoing - implement staffing attraction and retention strategy
Reticulation	WOS9	vandalism of infrastructure	High 10	Sites are secured, security cameras or CCTV at some locations, security patrols at some sites	Not a systemic issue at most locations, can occur at Loudoun Weir	No				3	No		

4 Verification Monitoring - Water Quality Information and Summary

The section shows the water quality characteristics sampled under WDRC's Verification Monitoring Program during 2023 - 2024.

The information is classified into:

- Water quality parameter.
- Schemes sampling for the specific parameter.
- Number of samples required under WDRC's Verification Monitoring Program

Number of samples collected and Tested by External and Internal Labs

4.1 Verification Monitoring Bell

Table 4-1 - Verification Monitoring Bell

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		5.00	5.00	5.00	**QHFSS** Network/Month - 1	14.00	
	Bromodichloro-acetic Acid - QHFSS		5.00	5.00	5.00			
	Bromodi-chloromethane - QHFSS		5.50	11.00	1.00			
	Bromoform - QHFSS		50.75	110.00	9.00			
	Chlorodibromo-acetic Acid - QHFSS		5.25	6.00	5.00			
	Chloroform - QHFSS		1.58	3.00	1.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.58	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		6.58	10.00	5.00			
	Dibromo-chloromethane - QHFSS		17.58	37.00	3.00			
	Dichloro-acetic Acid - QHFSS	Health 100	5.00	5.00	5.00			
	Monobromo-acetic Acid - QHFSS		5.33	7.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	5.00	5.00	5.00			
	Total Trihalomethane - QHFSS	Health 250	75.58	160.00	13.00			
	Trichloro-acetic Acid - QHFSS	Health 100	5.00	5.00	5.00			
	Chlorate - QHFSS	Health 0.8	0.17	0.42	0.03	**QHFSS** WTP/Month - 1	12	
	Chlorite - QHFSS	Health 0.8	0.01	0.05	0.01			
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS** WTP/Month - 1 Network - 1	24.00	468
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00			

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
						INTERNAL WTP - 2/7 days Network - 2/7 days		
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.01	0.01	0.01	**QHFSS** Network/Year - 1	1.00	
	Atrazine - QHFSS	Heath 20ug/L	0.02	0.02	0.02			
	Bromacil - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	DEET - QHFSS		0.01	0.01	0.01			
	Desethly Atrazine - QHFSS		0.01	0.01	0.01			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.01	0.01	0.01			
	Diuron - QHFSS	Health 20ug/L	0.10	0.10	0.10			
	Fluometuron - QHFSS	Heath 70ug/L	0.02	0.02	0.02			
	Hexazinone - QHFSS		0.01	0.01	0.01			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	Metolachlor - QHFSS		0.01	0.01	0.01			
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.05	0.05	0.05			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.01	0.01	0.01			
	Terbuthylazine - QHFSS		0.01	0.01	0.01			
	Terbutryn - QHFSS	Heath 10µg/L	0.05	0.05	0.05			
	Triethyl Phosphate - QHFSS		0.01	0.01	0.01			

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.19	0.19	0.19			
ST Chem	Alkalinity - QHFSS		476.36	660.00	430.00	**QHFSS** WTP/Month - 1	14	
	Aluminium - QHFSS	Aesthetic 0.2	0.03	0.04	0.03			
	Bicarbonate - QHFSS		566.73	788.00	517.00			
	Boron - QHFSS	Heath 4	0.07	0.09	0.07			
	Calcium - QHFSS		57.73	73.00	42.00			
	Carbonate - QHFSS		6.40	10.00	4.10			
	Chloride- QHFSS	Aesthetic 250	387.27	420.00	350.00			
	Conductivity - QHFSS		2100.00	2300.00	2000.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.00	0.01	0.00			
	Figure of Merit Ratio - QHFSS		0.53	0.70	0.30			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.31	0.41	0.25			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.00	0.00	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.01			
	Magnesium - QHFSS		52.09	60.00	44.00			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.00	0.00			
	Mole Ratio - QHFSS		2.02	2.20	1.80			
	Nitrate - QHFSS	Aesthetic 50	1.04	1.90	0.65			

	Parameter	ADWG Water Quality Criteria (*mg/L unless otherwise specified*)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (*as per the DWQMP*)	No. of Samples Sampled Internally & Externally (*As per the DWQMP*)	
							External	Internal
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	8.18	8.40	8.03			
	pH Saturation- QHFSS		7.08	7.10	7.00			
	Potassium - QHFSS		5.75	6.30	5.40			
	Residual Alkalinity - QHFSS	Aesthetic 150	2.35	7.50	0.60			
	Saturation Index - QHFSS		1.09	1.30	0.90			
	Silica- QHFSS	Aesthetic 80	20.73	22.00	19.00			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	315.45	410.00	280.00			
	Sodium Absorption Ratio - QHFSS		7.21	10.00	6.00			
	Sulphate - QHFSS	Aesthetic 250	29.18	31.00	24.00			
	Temporary Hardness - QHFSS		358.18	428.00	286.00			
	Total Dissolved Ions - QHFSS		1420.00	1670.00	1340.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	1145.45	1300.00	1100.00			
	Total Hardness - QHFSS	Aesthetic	358.18	428.00	286.00			
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of	1.09	2.00	1.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
Internal		Cryptosporidium & Gardai						
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.06			
	pH	6.5 - 8.5	7.71	8	0	WTP/Day - 1		583
	Free Chlorine Residual **Reportable Incident/s DWI-480-23-10433**	Target 0.2 - 5mg/L	0.97	4.4	0	WTP/Day - 1 Network/week - 3		583
	Turbidity	Less than 5 NTU	0.31	3.76	0			580

4.2 Verification Monitoring Chinchilla

Table 4-2 - Verification Monitoring Chinchilla

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value2.5	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		16.30	32.00	5.00	**QHFSS** Network/Month - 1	24	
	Bromodichloro-acetic Acid - QHFSS		18.70	31.00	5.00			
	Bromodichloromethane - QHFSS		49.91	98.00	16.00			
	Bromoform - QHFSS		32.57	300.00	1.00			
	Chlorodibromo-acetic Acid - QHFSS		13.52	34.00	5.00			
	Chloroform - QHFSS		71.65	200.00	18.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.78	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		13.39	34.00	5.00			
	Dibromo-chloromethane - QHFSS		59.61	290.00	4.00			
	Dichloro-acetic Acid - QHFSS	Health 100	30.26	83.00	5.00			
	Monobromo-acetic Acid - QHFSS		5.13	6.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	5.61	9.00	5.00			
	Total Trihalomethane - QHFSS **Reportable Incident/s DWI-480-24-10830**	Health 250	213.78	710.00	67.00			
	Trichloro-acetic Acid - QHFSS	Health 100	30.30	84.00	5.00			
	Chlorate - QHFSS	Health 0.8	0.32	0.35	0.28	**QHFSS** WTP/Month - 1	11	
	Chlorite - QHFSS	Health 0.8	0.06	0.10	0.01			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value2.5	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
Fluoride	Fluoride - QHFSS	Health 1.5	0.66	0.81	0.19	**QHFSS** WTP/Month - 3 Network - 3 **INTERNAL** WTP/Day - 1	61	599
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS** WTP/Month - 1 Network - 1 **INTERNAL** WTP - 2/7 days Network - 2/7 days	35	380
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00			
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.02	0.02	0.02	**QHFSS** Network/Year - 1	3	
	Atrazine - QHFSS	Heath 20ug/L	0.06	0.08	0.04			
	Bromacil - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	DEET - QHFSS		0.01	0.01	0.01			
	Desethly Atrazine - QHFSS		0.01	0.02	0.01			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.01	0.02	0.01			
	Diuron - QHFSS	Health 20ug/L	0.02	0.02	0.02			
	Fluometuron - QHFSS	Heath 70ug/L	0.04	0.05	0.02			
	Hexazinone - QHFSS		0.04	0.05	0.01			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	Metolachlor - QHFSS		0.11	0.17	0.05			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value2.5	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.04	0.05	0.02			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.02	0.02	0.01			
	Terbuthylazine - QHFSS		0.09	0.14	0.04			
	Terbutryn - QHFSS	Heath 10µg/L	0.04	0.05	0.02			
	Triethyl Phosphate - QHFSS		0.01	0.01	0.01			
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.19	0.20	0.19			
ST Chem	Alkalinity - QHFSS		102.18	170.00	48.00	**QHFSS** Network/Month - 1	19	
	Aluminium - QHFSS	Aesthetic 0.2	0.16	0.25	0.11			
	Bicarbonate - QHFSS		122.91	201.00	58.00			
	Boron - QHFSS	Heath 4	0.06	0.12	0.04			
	Calcium - QHFSS		29.51	60.00	9.60			
	Carbonate - QHFSS		0.55	1.40	0.10			
	Chloride- QHFSS	Aesthetic 250	122.45	380.00	26.00			
	Conductivity - QHFSS		792.73	1700.00	500.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.00	0.01	0.00			
	Figure of Merit Ratio - QHFSS		0.84	1.30	0.30			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.62	0.74	0.19			
	Hydrogen - QHFSS		0.00	0.00	0.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value2.5	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Hydroxide - QHFSS		0.00	0.00	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.01			
	Magnesium - QHFSS		21.85	52.00	5.20			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.00	0.00			
	Mole Ratio - QHFSS		2.64	3.00	2.30			
	Nitrate - QHFSS	Aesthetic 50	1.54	4.50	0.05			
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	7.74	8.23	7.27			
	pH Saturation- QHFSS		8.12	8.80	7.50			
	Potassium - QHFSS		5.71	8.40	5.00			
	Residual Alkalinity - QHFSS	Aesthetic 150	0.00	0.00	0.00			
	Saturation Index - QHFSS		-0.35	0.50	-1.50			
	Silica- QHFSS	Aesthetic 80	10.07	18.00	6.30			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	89.73	180.00	76.00			
	Sodium Absorption Ratio - QHFSS		3.36	5.10	2.30			
	Sulphate - QHFSS	Aesthetic 250	87.27	140.00	57.00			
	Temporary Hardness - QHFSS		101.36	167.00	45.00			
	Total Dissolved Ions - QHFSS		482.45	952.00	316.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	430.91	860.00	300.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value2.5	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Total Hardness - QHFSS	Aesthetic	163.45	364.00	45.00			
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of Cryptosporidium & Gardai	1.00	1.00	1.00			
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.06			
Internal	pH	6.5 - 8.5	7.5	7.8	0	WTP/Day - 1 Network/week - 3		1571
	Free Chlorine Residual	Target 0.2 - 5mg/L	1.42	4.5	0			1571
	Turbidity	Less than 5 NTU	0.34	2.83	0			1571

4.3 Verification Monitoring Condamine

Table 4-3 - Verification Monitoring Condamine

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		16.58	24.00	9.00	**QHFSS** Network/Month - 1	12	
	Bromodichloro-acetic Acid - QHFSS		15.75	33.00	8.00			
	Bromodi-chloromethane - QHFSS		21.50	48.00	6.00			
	Bromoform - QHFSS		11.50	42.00	1.00			
	Chlorodibromo-acetic Acid - QHFSS		8.33	16.00	5.00			
	Chloroform - QHFSS		77.33	420.00	4.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	10.42	20.00	5.00			
	Dibromo-acetic Acid - QHFSS		10.92	31.00	5.00			
	Dibromo-chloromethane - QHFSS		20.00	69.00	1.00			
	Dichloro-acetic Acid - QHFSS **Reportable Incident DWI-480-23-10739**	Health 100	53.92	230.00	6.00			
	Monobromo-acetic Acid - QHFSS		5.08	6.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	8.25	21.00	5.00			
	Total Trihalomethane - QHFSS **Reportable Incident DWI-480-23-10738**	Health 250	130.17	457.00	45.00			
	Trichloro-acetic Acid - QHFSS **Reportable Incident DWI-480-24-10986**	Health 100	71.58	360.00	5.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Chlorate - QHFSS	Health 0.8	0.46	1.61	0.12	**QHFSS** WTP/Month - 1	12	
	Chlorite - QHFSS **Reportable Incident** ***DWI-480-23-10737***	Health 0.8	0.11	1.00	0.01			
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS** WTP/Month - 1 Network/Month - 1 **IINTERNAL** WTP/days - 2/7 Network/days - 2/7	26	209
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00			
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.02	0.02	0.02	**QHFSS** Network/Year - 4	6	
	Atrazine - QHFSS	Heath 20ug/L	0.14	0.47	0.03			
	Bromacil - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	DEET - QHFSS		0.01	0.01	0.01			
	Desethly Atrazine - QHFSS		0.05	0.13	0.01			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.02	0.06	0.01			
	Diuron - QHFSS	Health 20ug/L	0.03	0.10	0.02			
	Fluometuron - QHFSS	Heath 70ug/L	0.04	0.05	0.02			
	Hexazinone - QHFSS		0.03	0.05	0.01			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	Metolachlor - QHFSS		0.44	1.30	0.05			
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.06	0.10	0.05			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.04	0.05	0.02			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.08	0.15	0.02			
	Terbuthylazine - QHFSS		0.05	0.13	0.02			
	Terbutryn - QHFSS	Heath 10µg/L	0.04	0.05	0.02			
	Triethyl Phosphate - QHFSS		0.01	0.02	0.01			
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.17	0.20	0.02			
ST Chem	Alkalinity - QHFSS		97.55	130.00	51.00	**QHFSS** Network/Month - 1	24.00	
	Aluminium - QHFSS	Aesthetic 0.2	0.03	0.04	0.03			
	Bicarbonate - QHFSS		117.00	159.00	62.00			
	Boron - QHFSS	Heath 4	0.09	0.14	0.05			
	Calcium - QHFSS		19.28	34.00	7.60			
	Carbonate - QHFSS		0.84	2.10	0.00			
	Chloride- QHFSS	Aesthetic 250	96.82	170.00	41.00			
	Conductivity - QHFSS		520.91	820.00	280.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.00	0.01	0.00			
	Figure of Merit Ratio - QHFSS		0.72	1.00	0.30			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.13	0.19	0.09			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.00	0.00	0.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.01			
	Magnesium - QHFSS		13.05	24.00	4.10			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.03	0.00			
	Mole Ratio - QHFSS		2.45	3.50	1.70			
	Nitrate - QHFSS	Aesthetic 50	1.50	5.10	0.05			
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	7.90	8.34	7.12			
	pH Saturation- QHFSS		8.30	8.90	7.90			
	Potassium - QHFSS		4.78	5.50	3.70			
	Residual Alkalinity - QHFSS	Aesthetic 150	0.27	0.70	0.00			
	Saturation Index - QHFSS		-0.39	0.50	-1.70			
	Silica- QHFSS	Aesthetic 80	11.04	16.00	7.20			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	61.73	89.00	39.00			
	Sodium Absorption Ratio - QHFSS		2.84	4.20	2.30			
	Sulphate - QHFSS	Aesthetic 250	5.30	6.90	3.20			
	Temporary Hardness - QHFSS		83.64	134.00	36.00			
	Total Dissolved Ions - QHFSS		320.09	482.00	177.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	272.73	410.00	150.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Total Hardness - QHFSS	Aesthetic	101.82	184.00	36.00			
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of Cryptosporidium & Gardai	1.00	1.00	1.00			
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.06			
Internal	pH	6.5 - 8.5	7.65	7.9	0	WTP/Day - 1 Network/week - 3		1152
	Free Chlorine Residual	Target 0.2 - 5mg/L	1.27	2.1	0			1151
	Turbidity	Less than 5 NTU	0.33	2.2	0			1131

4.4 Verification Monitoring Dalby

Table 4-4 - Verification Monitoring Dalby

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		5.92	10.00	5.00	**QHFSS** Network/Month - 1	12	
	Bromodichloro-acetic Acid - QHFSS		5.33	9.00	5.00			
	Bromodi-chloromethane - QHFSS		7.25	22.00	1.00			
	Bromoform - QHFSS		29.83	62.00	5.00			
	Chlorodibromo-acetic Acid - QHFSS		6.17	11.00	5.00			
	Chloroform - QHFSS		2.17	7.00	1.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.58	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		9.17	19.00	5.00			
	Dibromo-chloromethane - QHFSS		22.08	58.00	2.00			
	Dichloro-acetic Acid - QHFSS	Health 100	5.00	5.00	5.00			
	Monobromo-acetic Acid - QHFSS		5.00	5.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	5.00	5.00	5.00			
	Total Trihalomethane - QHFSS	Health 250	59.83	140.00	8.00			
	Trichloro-acetic Acid - QHFSS	Health 100	5.00	5.00	5.00			
	Chlorate - QHFSS **Reportable Incident DWI-480-24-10848**	Health 0.8	0.25	0.87	0.04	**QHFSS** WTP/Month - 1	12	
	Chlorite - QHFSS	Health 0.8	0.01	0.02	0.01			
Fluoride	Fluoride - QHFSS	Heath 1.5	0.75	0.88	0.02	**QHFSS** WTP/Month - 3	73	172

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
						Network - 3 **INTERNAL** WTP/Day - 1		
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS** WTP/Month - 1 LLR/Month - 1 Network/Month - 1 **IINTERNAL** WTP/days - 2/7 Network/days - 2/7	36	266
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00			
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.02	0.03	0.02	**QHFSS** WTP/Year - 1 Network/Year - 4	14	
	Atrazine - QHFSS	Heath 20ug/L	0.24	1.50	0.02			
	Bromacil - QHFSS	Health 400ug/L	0.05	0.06	0.05			
	DEET - QHFSS		0.02	0.06	0.01			
	Desethly Atrazine - QHFSS		0.03	0.15	0.01			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.02	0.07	0.01			
	Diuron - QHFSS	Health 20ug/L	0.02	0.04	0.02			
	Fluometuron - QHFSS	Heath 70ug/L	0.04	0.05	0.02			
	Hexazinone - QHFSS		0.04	0.05	0.01			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.05	0.02			
	Metolachlor - QHFSS		0.29	1.90	0.01			
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.05	0.10	0.05			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.04	0.05	0.02			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.04	0.12	0.01			
	Terbuthylazine - QHFSS		0.08	0.35	0.01			
	Terbutryn - QHFSS	Heath 10µg/L	0.04	0.05	0.02			
	Triethyl Phosphate - QHFSS		0.03	0.13	0.01			
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.23	0.40	0.19			
ST Chem	Alkalinity - QHFSS		193.00	250.00	110.00	**QHFSS** Network/Month - 3	41	
	Aluminium - QHFSS	Aesthetic 0.2	0.03	0.07	0.03			
	Bicarbonate - QHFSS		231.55	289.00	129.00			
	Boron - QHFSS	Heath 4	0.08	0.12	0.03			
	Calcium - QHFSS		26.10	60.00	15.00			
	Carbonate - QHFSS		1.35	6.50	0.20			
	Chloride- QHFSS	Aesthetic 250	142.65	250.00	30.00			
	Conductivity - QHFSS		889.00	1300.00	320.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.02	0.09	0.00			
	Figure of Merit Ratio - QHFSS		0.81	2.10	0.40			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.60	0.84	0.12			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.01	0.10	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.05	0.01			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Magnesium - QHFSS		24.35	65.00	13.00			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.01	0.00			
	Mole Ratio - QHFSS		2.34	3.10	1.80			
	Nitrate - QHFSS	Aesthetic 50	0.99	4.40	0.05			
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	7.86	8.52	7.15			
	pH Saturation- QHFSS		7.82	8.20	7.30			
	Potassium - QHFSS		2.77	7.30	0.90			
	Residual Alkalinity - QHFSS	Aesthetic 150	0.90	2.00	0.00			
	Saturation Index - QHFSS		0.03	1.20	-0.80			
	Silica- QHFSS	Aesthetic 80	15.98	23.00	2.00			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	119.60	160.00	24.00			
	Sodium Absorption Ratio - QHFSS		4.38	6.10	1.10			
	Sulphate - QHFSS	Aesthetic 250	34.43	85.00	6.70			
	Temporary Hardness - QHFSS		147.08	247.00	92.00			
	Total Dissolved Ions - QHFSS		582.88	797.00	229.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	482.00	660.00	180.00			
	Total Hardness - QHFSS	Aesthetic	165.43	418.00	92.00			
	True Colour - QHFSS	Aesthetic 15 HU	10.68	64.00	8.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of Cryptosporidium & Gardai	6.15	110.00	1.00			
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.01			
Internal	pH	6.5 - 8.5	7.42	8.1	0	LLR/Day - 1 Network/Week - 3		1095
	Free Chlorine Residual	Target 0.2 - 5mg/L	1.06	3.2	0			
	Turbidity	Less than 5 NTU	0.2	1.27	0			
	Conductivity	Less than 1000uS/cm	874	1300	0	LLR/Week - 1 Network/Week - 3		1090

4.5 Verification Monitoring Jandowae

Table 4-5 - Verification Monitoring Jandowae

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		9.00	17.00	5.00	**QHFSS** Network/Month - 1	13.00	
	Bromodichloro-acetic Acid - QHFSS		8.85	16.00	5.00			
	Bromodi-chloromethane - QHFSS		38.00	55.00	27.00			
	Bromoform - QHFSS		1.15	2.00	1.00			
	Chlorodibromo-acetic Acid - QHFSS		5.00	5.00	5.00			
	Chloroform - QHFSS		190.85	300.00	1.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.62	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		5.00	5.00	5.00			
	Dibromo-chloromethane - QHFSS		7.69	17.00	2.00			
	Dichloro-acetic Acid - QHFSS	Health 100	45.69	140.00	5.00			
	Monobromo-acetic Acid - QHFSS		5.00	5.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	6.46	15.00	5.00			
	Total Trihalomethane - QHFSS **Reportable Incident DWI-480-24-10592**	Health 250	238.46	330.00	30.00			
	Trichloro-acetic Acid - QHFSS	Health 100	69.23	230.00	16.00			
	Chlorate - QHFSS	Health 0.8	0.21	0.43	0.09	**QHFSS** WTP/Month - 1	12.00	
	Chlorite - QHFSS	Health 0.8	0.02	0.10	0.01			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS** LLR/Month - 1 Network/Month - 1	22.00	314
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00		22.00	
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.02	0.02	0.02	**QHFSS** Network/Year - 1	4.00	
	Atrazine - QHFSS	Heath 20ug/L	0.10	0.11	0.09			
	Bromacil - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	DEET - QHFSS		0.01	0.01	0.01			
	Desethly Atrazine - QHFSS		0.17	0.19	0.15			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.07	0.07	0.06			
	Diuron - QHFSS	Health 20ug/L	0.02	0.02	0.02			
	Fluometuron - QHFSS	Heath 70ug/L	0.05	0.05	0.05			
	Hexazinone - QHFSS		0.05	0.05	0.05			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	Metolachlor - QHFSS		3.75	4.60	3.00			
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.05	0.05	0.05			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.02	0.03	0.01			
	Terbuthylazine - QHFSS		0.01	0.01	0.01			
	Terbutryn - QHFSS	Heath 10µg/L	0.05	0.05	0.05			
	Triethyl Phosphate - QHFSS		0.01	0.01	0.01			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.19	0.19	0.19			
ST Chem	Alkalinity - QHFSS		72.00	82.00	68.00	**QHFSS** Network/Month - 1	13.00	
	Aluminium - QHFSS	Aesthetic 0.2	0.04	0.06	0.03			
	Bicarbonate - QHFSS		85.38	98.00	79.00			
	Boron - QHFSS	Heath 4	0.05	0.07	0.04			
	Calcium - QHFSS		10.08	11.00	8.80			
	Carbonate - QHFSS		1.18	3.10	0.20			
	Chloride- QHFSS	Aesthetic 250	27.23	33.00	21.00			
	Conductivity - QHFSS		244.62	280.00	220.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.00	0.01	0.00			
	Figure of Merit Ratio - QHFSS		0.66	0.80	0.60			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.19	0.25	0.16			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.03	0.10	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.01			
	Magnesium - QHFSS		4.41	5.00	4.00			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.00	0.00			
	Mole Ratio - QHFSS		1.68	2.40	1.20			
	Nitrate - QHFSS	Aesthetic 50	3.42	4.60	0.67			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	8.32	8.83	7.51			
	pH Saturation- QHFSS		8.59	8.70	8.50			
	Potassium - QHFSS		6.76	7.80	6.10			
	Residual Alkalinity - QHFSS	Aesthetic 150	0.56	0.70	0.50			
	Saturation Index - QHFSS		-0.30	0.30	-1.10			
	Silica- QHFSS	Aesthetic 80	11.02	15.00	9.20			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	30.54	35.00	26.00			
	Sodium Absorption Ratio - QHFSS		2.02	2.20	1.80			
	Sulphate - QHFSS	Aesthetic 250	4.75	7.50	1.80			
	Temporary Hardness - QHFSS		43.46	49.00	38.00			
	Total Dissolved Ions - QHFSS		173.77	194.00	156.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	143.08	160.00	130.00			
	Total Hardness - QHFSS	Aesthetic	43.46	49.00	38.00			
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of	1.00	1.00	1.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
		Cryptosporidium & Gardai						
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.06			
	pH	6.5 - 8.5	7.85	8.2	7	WTP/Day - 1 Network/Week - 3		1241
	Free Chlorine Residual **Reportable Incident DWI-480-23-10672**	Target 0.2 - 5mg/L	1.55	5	0.2			1240
	Turbidity	Less than 5 NTU	0.26	2.5	0			1238

4.6 Verification Monitoring Miles

Table 4-6 - Verification Monitoring Miles

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		11.42	25.00	7.00	**QHFSS** Network/Month - 1	12.00	
	Bromodichloro-acetic Acid - QHFSS		11.67	18.00	8.00			
	Bromodi-chloromethane - QHFSS		31.83	49.00	19.00			
	Bromoform - QHFSS		1.50	3.00	1.00			
	Chlorodibromo-acetic Acid - QHFSS		5.42	10.00	5.00			
	Chloroform - QHFSS		88.00	120.00	57.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.58	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		5.83	10.00	5.00			
	Dibromo-chloromethane - QHFSS		13.33	28.00	5.00			
	Dichloro-acetic Acid - QHFSS	Health 100	35.67	65.00	26.00			
	Monobromo-acetic Acid - QHFSS		5.42	10.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	5.50	10.00	5.00			
	Total Trihalomethane - QHFSS	Health 250	135.83	180.00	90.00			
	Trichloro-acetic Acid - QHFSS	Health 100	39.75	51.00	24.00			
	Chlorate - QHFSS	Health 0.8	0.47	0.73	0.24	**QHFSS** LLR/Month - 1	12	
	Chlorite - QHFSS	Health 0.8	0.02	0.10	0.01			
Fluoride	Fluoride - QHFSS	Heath 1.5	0.07	0.10	0.05	**QHFSS** Network/Month - 1	41	315
Microbiology	Presence E. coli - QHFSS	Health 0	0.00	0.00	0.00	**QHFSS**	14.00	177

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Presence Total Coliforms - QHFSS	Health 0	0.00	0.00	0.00	WTP/Month - 1 Network/Month - 1 **INTERNAL** WTP - 2/7 days Network - 2/7 days		
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.02	0.02	0.02	**QHFSS** Network/Year - 1	5.00	
	Atrazine - QHFSS	Heath 20ug/L	0.02	0.02	0.02			
	Bromacil - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	DEET - QHFSS		0.01	0.01	0.01			
	Desethly Atrazine - QHFSS		0.01	0.01	0.01			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.01	0.02	0.01			
	Diuron - QHFSS	Health 20ug/L	0.02	0.02	0.02			
	Fluometuron - QHFSS	Heath 70ug/L	0.03	0.05	0.02			
	Hexazinone - QHFSS		0.03	0.05	0.01			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	Metolachlor - QHFSS		0.01	0.02	0.01			
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.04	0.05	0.02			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.02	0.03	0.01			
	Terbuthylazine - QHFSS		0.01	0.01	0.01			
	Terbutryn - QHFSS	Heath 10µg/L	0.04	0.05	0.02			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Triethyl Phosphate - QHFSS		0.03	0.07	0.01			
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.20	0.20	0.20			
ST Chem	Alkalinity - QHFSS		66.42	80.00	20.00	**QHFSS** Network/Month - 1	12.00	
	Aluminium - QHFSS	Aesthetic 0.2	0.03	0.03	0.03			
	Bicarbonate - QHFSS		82.50	97.00	48.00			
	Boron - QHFSS	Heath 4	0.09	0.11	0.04			
	Calcium - QHFSS		8.13	9.90	3.10			
	Carbonate - QHFSS		0.17	0.40	0.00			
	Chloride- QHFSS	Aesthetic 250	60.67	70.00	41.00			
	Conductivity - QHFSS		337.50	390.00	220.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.00	0.01	0.00			
	Figure of Merit Ratio - QHFSS		0.20	0.20	0.20			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.07	0.09	0.04			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.00	0.00	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.01			
	Magnesium - QHFSS		1.35	1.90	0.81			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.00	0.00			
	Mole Ratio - QHFSS		2.85	3.30	2.40			
	Nitrate - QHFSS	Aesthetic 50	0.50	1.20	0.08			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	7.43	7.83	6.87			
	pH Saturation- QHFSS		8.74	9.40	8.60			
	Potassium - QHFSS		2.38	2.90	1.70			
	Residual Alkalinity - QHFSS	Aesthetic 150	0.83	1.00	0.50			
	Saturation Index - QHFSS		-1.31	-0.80	-2.10			
	Silica- QHFSS	Aesthetic 80	7.00	9.40	5.60			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	57.92	69.00	39.00			
	Sodium Absorption Ratio - QHFSS		5.00	5.90	4.20			
	Sulphate - QHFSS	Aesthetic 250	1.60	3.00	0.60			
	Temporary Hardness - QHFSS		25.83	32.00	14.00			
	Total Dissolved Ions - QHFSS		215.58	247.00	140.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	182.50	210.00	130.00			
	Total Hardness - QHFSS	Aesthetic	25.83	32.00	14.00			
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of	1.00	1.00	1.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
		Cryptosporidium & Gardai						
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.06			
	pH	6.5 - 8.5	7.54	7.9	7.3	LLR/Day - 1 Network/Week - 3		642
	Free Chlorine Residual	Target 0.2 - 5mg/L	1.47	3	0.07			
	Turbidity **Reportable Incident DWI-480-24-10916**	Less than 5 NTU	0.18	1.7	0.08			

4.7 Verification Monitoring Tara

Table 4-7 - Verification Monitoring Tara

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		8.45	17.00	5.00	**QHFSS** Network/Month - 1	11	
	Bromodichloro-acetic Acid - QHFSS		8.36	18.00	5.00			
	Bromodi-chloromethane - QHFSS		24.27	51.00	1.00			
	Bromoform - QHFSS		2.45	5.00	1.00			
	Chlorodibromo-acetic Acid - QHFSS		5.00	5.00	5.00			
	Chloroform - QHFSS		44.45	100.00	1.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.55	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		6.18	12.00	5.00			
	Dibromo-chloromethane - QHFSS		12.82	23.00	1.00			
	Dichloro-acetic Acid - QHFSS	Health 100	15.82	36.00	5.00			
	Monobromo-acetic Acid - QHFSS		5.00	5.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	5.00	5.00	5.00			
	Total Trihalomethane - QHFSS	Health 250	84.45	180.00	4.00			
	Trichloro-acetic Acid - QHFSS	Health 100	21.82	50.00	5.00			
	Chlorate - QHFSS **Reportable Incident DWI-480-24-10837**	Health 0.8	0.47	0.47	0.47	**QHFSS** LLR/Month - 1	10	
	Chlorite - QHFSS	Health 0.8	0.01	0.01	0.01			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS** WTP/Month - 1 Network/Month - 1 **INTERNAL** WTP/7 Days - 2 Network/7 Days - 2	24	198
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00			
ST Chem	Alkalinity - QHFSS		141.00	170.00	120.00	**QHFSS** Network/Month - 1	16.00	
	Aluminium - QHFSS	Aesthetic 0.2	0.04	0.18	0.00			
	Bicarbonate - QHFSS		164.50	185.00	137.00			
	Boron - QHFSS	Heath 4	0.17	0.22	0.00			
	Calcium - QHFSS		1.21	2.00	0.60			
	Carbonate - QHFSS		3.20	12.00	0.70			
	Chloride- QHFSS	Aesthetic 250	104.89	510.89	45.00			
	Conductivity - QHFSS		458.00	520.00	370.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.02	0.03	0.00			
	Figure of Merit Ratio - QHFSS		0.00	0.00	0.00			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.12	0.13	0.09			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.04	0.20	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Magnesium - QHFSS		0.44	1.00	0.04			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.01	0.06	0.00			
	Mole Ratio - QHFSS		1.71	2.20	0.80			
	Nitrate - QHFSS	Aesthetic 50	0.80	2.20	0.47			
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	8.31	9.02	7.79			
	pH Saturation- QHFSS		9.29	9.50	9.10			
	Potassium - QHFSS		1.79	11.00	0.33			
	Residual Alkalinity - QHFSS	Aesthetic 150	2.69	3.20	2.10			
	Saturation Index - QHFSS		-0.98	-0.30	-1.50			
	Silica- QHFSS	Aesthetic 80	8.93	12.00	5.40			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	102.40	120.00	83.00			
	Sodium Absorption Ratio - QHFSS		24.20	37.00	12.00			
	Sulphate - QHFSS	Aesthetic 250	0.85	2.30	0.01			
	Temporary Hardness - QHFSS		4.81	9.20	1.80			
	Total Dissolved Ions - QHFSS		330.80	373.00	274.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	257.00	290.00	210.00			
	Total Hardness - QHFSS	Aesthetic	4.81	9.20	1.80			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of Cryptosporidium & Gardai	1.00	1.00	1.00			
	Zinc - QHFSS	Aesthetic 3	0.05	0.06	0.01			
Internal	pH	6.5 - 8.5	7.65	8.6	7	WTP/Day - 1 Network/Week - 3		1229
	Free Chlorine Residual **Reportable Incident** **DWI-480-24-10844** **DWI-480-24-10915** **DWI-480-24-11009**	Target 0.2 - 5mg/L	1.79	6	0.1			1232
	Turbidity	Less than 5 NTU	0.16	1.49	0			1226

4.8 Verification Monitoring Wandoan

***Table** 4-8 - Verification Monitoring Wandoan*

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		6.17	19.00	5.00	**QHFSS** Network/Month - 1	13.00	
	Bromodichloro-acetic Acid - QHFSS		5.17	7.00	5.00			
	Bromodi-chloromethane - QHFSS		5.17	38.00	1.00			
	Bromoform - QHFSS		12.67	140.00	1.00			
	Chlorodibromo-acetic Acid - QHFSS		5.75	14.00	5.00			
	Chloroform - QHFSS		2.92	9.00	1.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.58	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		8.00	41.00	5.00			
	Dibromo-chloromethane - QHFSS		10.67	110.00	1.00			
	Dichloro-acetic Acid - QHFSS	Health 100	7.67	12.00	5.00			
	Monobromo-acetic Acid - QHFSS		5.08	6.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	10.42	18.00	5.00			
	Total Trihalomethane - QHFSS	Health 250	31.17	300.00	4.00			
	Trichloro-acetic Acid - QHFSS	Health 100	5.00	5.00	5.00			
	Chlorate - QHFSS **Reportable Incident DWI-480-24-10838**	Health 0.8	0.37	0.86	0.18	**QHFSS** WTP/Month - 1	12	
	Chlorite - QHFSS	Health 0.8	0.01	0.01	0.01			
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS**	20.00	271

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00	Network - Only as required **INTERNAL** WTP/7 Days - 2 Network/7 Days - 2		
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.02	0.02	0.02	**QHFSS** Network/Year - 1	2.0	
	Atrazine - QHFSS	Heath 20ug/L	0.02	0.02	0.02			
	Bromacil - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	DEET - QHFSS		0.01	0.01	0.01			
	Desethly Atrazine - QHFSS		0.01	0.01	0.01			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.01	0.01	0.01			
	Diuron - QHFSS	Health 20ug/L	0.02	0.02	0.02			
	Fluometuron - QHFSS	Heath 70ug/L	0.02	0.02	0.02			
	Hexazinone - QHFSS		0.01	0.01	0.01			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	Metolachlor - QHFSS		0.01	0.01	0.01			
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.02	0.02	0.02			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.02	0.02	0.02			
	Terbuthylazine - QHFSS		0.01	0.01	0.01			
	Terbutryn - QHFSS	Heath 10µg/L	0.02	0.02	0.02			
	Triethyl Phosphate - QHFSS		0.01	0.01	0.01			

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
							External	Internal
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.19	0.19	0.19			
ST Chem	Alkalinity - QHFSS		83.18	87.00	81.00		26	
	Aluminium - QHFSS	Aesthetic 0.2	0.04	0.11	0.03			
	Bicarbonate - QHFSS		100.41	104.00	97.00			
	Boron - QHFSS	Heath 4	0.02	0.03	0.02			
	Calcium - QHFSS		11.92	15.00	4.40			
	Carbonate - QHFSS		0.57	0.90	0.30			
	Chloride- QHFSS	Aesthetic 250	38.59	45.00	25.00			
	Conductivity - QHFSS		284.09	300.00	240.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.00	0.01	0.00			
	Figure of Merit Ratio - QHFSS		0.38	2.10	0.10			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.31	0.33	0.24			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.00	0.00	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.01			
	Magnesium - QHFSS		0.11	0.21	0.05			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.00	0.00			
	Mole Ratio - QHFSS		2.00	2.30	0.30			
	Nitrate - QHFSS	Aesthetic 50	0.19	0.31	0.11			
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	7.98	8.20	7.73			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
	pH Saturation- QHFSS		8.46	8.90	8.40			
	Potassium - QHFSS		1.87	2.10	1.70			
	Residual Alkalinity - QHFSS	Aesthetic 150	1.07	1.50	0.90			
	Saturation Index - QHFSS		-0.50	-0.20	-0.90			
	Silica- QHFSS	Aesthetic 80	24.32	25.00	24.00			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	47.45	49.00	46.00			
	Sodium Absorption Ratio - QHFSS		3.85	6.30	3.30			
	Sulphate - QHFSS	Aesthetic 250	0.21	0.40	0.20			
	Temporary Hardness - QHFSS		30.41	38.00	11.00			
	Total Dissolved Ions - QHFSS		201.64	211.00	184.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	175.00	180.00	160.00			
	Total Hardness - QHFSS	Aesthetic	30.41	38.00	11.00			
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of Cryptosporidium & Gardai	1.00	1.00	1.00			
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.06			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
							External	Internal
Internal	pH	6.5 - 8.5	7.58	7.9	7.4	WTP/Day - 1 Network/Week - 3		440
	Free Chlorine Residual	Target 0.2 - 5mg/L	0.94	1.7	0.4			443
	Turbidity	Less than 5 NTU	0.2	0.76	0.08			440

4.9 Verification Monitoring Warra

Table 4-9 - Verification Monitoring Warra

	Parameter	ADWG Water Quality Criteria (mg/L unless otherwise specified)	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled (as per the DWQMP)	No. of Samples Sampled Internally & Externally (As per the DWQMP)	
Disinfection By Product	Bromochloro-acetic Acid - QHFSS		15.42	23.00	9.00	**QHFSS** Network/Month - 1	13	
	Bromodichloro-acetic Acid - QHFSS		6.33	9.00	5.00			
	Bromodi-chloromethane - QHFSS		31.58	55.00	8.00			
	Bromoform - QHFSS		129.17	190.00	100.00			
	Chlorodibromo-acetic Acid - QHFSS		12.08	19.00	7.00			
	Chloroform - QHFSS		6.75	15.00	1.00			
	Dalapon - 2,2-DPA - QHFSS	Health 500	9.58	10.00	5.00			
	Dibromo-acetic Acid - QHFSS		29.50	41.00	18.00			
	Dibromo-chloromethane - QHFSS		95.08	160.00	46.00			
	Dichloro-acetic Acid - QHFSS	Health 100	6.17	13.00	5.00			
	Monobromo-acetic Acid - QHFSS		5.42	7.00	5.00			
	Monochloro-acetic Acid - QHFSS	Health 150	5.00	5.00	5.00			
	Total Trihalomethane - QHFSS	Health 250	264.17	420.00	170.00			
	Trichloro-acetic Acid - QHFSS	Health 100	5.00	5.00	5.00			
	Chlorate - QHFSS	Health 0.8	0.36	0.90	0.15	**QHFSS** WTP/Month - 1	13	
	Chlorite - QHFSS	Health 0.8	0.02	0.10	0.01			
Microbiology	Presence E. coli - QHFSS	Health 0.0	0.00	0.00	0.00	**QHFSS** WTP/Month - 1 Network/Month - 1 **INTERNAL**	21	244
	Presence Total Coliforms - QHFSS	Health 0.0	0.00	0.00	0.00			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
						WTP/7 Days - 2 Network/7 days/2		
Pesticide	Ametryn - QHFSS	Heath 70ug/L	0.02	0.02	0.02	**QHFSS** Network/Year	6.0	
	Atrazine - QHFSS	Heath 20ug/L	0.13	0.13	0.12			
	Bromacil - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	DEET - QHFSS		0.01	0.01	0.01			
	Desethly Atrazine - QHFSS		0.05	0.06	0.04			
	Desisopropyl Atrazine - QHFSS	Heath 70ug/L	0.02	0.02	0.01			
	Diuron - QHFSS	Health 20ug/L	0.02	0.02	0.02			
	Fluometuron - QHFSS	Heath 70ug/L	0.05	0.05	0.05			
	Hexazinone - QHFSS		0.05	0.05	0.05			
	Imidacloprid - QHFSS	Health 400ug/L	0.02	0.02	0.02			
	Metolachlor - QHFSS		0.02	0.02	0.02			
	N-Butylbenzenesulfonamide - QHFSS	Health 400ug/L	0.05	0.05	0.05			
	Prometryn - QHFSS		0.01	0.01	0.01			
	Simazine - QHFSS		0.05	0.05	0.05			
	Tebuthiuron - QHFSS	Heath 20ug/L	0.04	0.04	0.04			
	Terbuthylazine - QHFSS		0.03	0.03	0.02			
	Terbutryn - QHFSS	Heath 10µg/L	0.05	0.05	0.05			
	Triethyl Phosphate - QHFSS		0.01	0.01	0.01			
	Tris(Chloropropyl) Phosphate Isomers - QHFSS		0.19	0.19	0.19			
ST Chem	Alkalinity - QHFSS		184.44	210.00	160.00	QHFSS Network/Year - 6	9.00	
	Aluminium - QHFSS	Aesthetic 0.2	0.05	0.08	0.00		16	

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
	Bicarbonate - QHFSS		216.44	248.00	186.00			
	Boron - QHFSS	Heath 4	0.07	0.07	0.06			
	Calcium - QHFSS		35.56	47.00	24.00			
	Carbonate - QHFSS		4.17	6.00	1.60			
	Chloride- QHFSS	Aesthetic 250	267.78	290.00	220.00			
	Conductivity - QHFSS		1255.56	1300.00	1100.00			
	Copper - QHFSS	Aesthetic 1 Heath 2	0.01	0.01	0.00			
	Figure of Merit Ratio - QHFSS		1.01	1.20	0.90			
	Fluoride (ST Chem) - QHFSS	Heath 1.5	0.27	0.29	0.24			
	Hydrogen - QHFSS		0.00	0.00	0.00			
	Hydroxide - QHFSS		0.06	0.10	0.00			
	Iron - QHFSS	Aesthetic 0.3	0.01	0.01	0.01			
	Magnesium - QHFSS		48.44	52.00	40.00			
	Manganese - QHFSS	Aesthetic 01 Heath 0.5	0.00	0.01	0.00			
	Mole Ratio - QHFSS		2.22	3.60	1.90			
	Nitrate - QHFSS	Aesthetic 50	0.53	0.69	0.35			
	pH - QHFSS	Aesthetic 6.5 - 8.5pH	8.42	8.60	7.99			
	pH Saturation- QHFSS		7.69	7.90	7.50			
	Potassium - QHFSS		12.44	13.00	10.00			
	Residual Alkalinity - QHFSS	Aesthetic 150	0.00	0.00	0.00			
	Saturation Index - QHFSS		0.72	0.90	0.40			

	Parameter	ADWG Water Quality Criteria *(mg/L unless otherwise specified)*	Average Water Quality Value	Max Water Quality Value	Min Water Quality Value	No. of Samples Required to be Sampled *(as per the DWQMP)*	No. of Samples Sampled Internally & Externally *(As per the DWQMP)*	
	Silica- QHFSS	Aesthetic 80	3.54	7.10	0.93			
	Sodium - QHFSS	Aesthetic 180 Heath 180 ug/L	132.22	140.00	120.00			
	Sodium Absorption Ratio - QHFSS		3.17	3.70	2.10			
	Sulphate - QHFSS	Aesthetic 250	13.89	15.00	13.00			
	Temporary Hardness - QHFSS		184.44	211.00	159.00			
	Total Dissolved Ions - QHFSS		730.56	771.00	673.00			
	Total Dissolved Solids - QHFSS	Heath 500 µg/L Aesthetic 600 µg/L	623.33	660.00	560.00			
	Total Hardness - QHFSS	Aesthetic	287.78	316.00	261.00			
	True Colour - QHFSS	Aesthetic 15 HU	8.00	8.00	8.00			
	Turbidity - QHFSS	Aesthetic 5 NTU <1 NTU is the target for effective disinfection <0.2 NTU is the target for effective filtration of Cryptosporidium & Gardai	1.00	1.00	1.00			
	Zinc - QHFSS	Aesthetic 3	0.06	0.06	0.06			
Internal	pH	6.5 - 8.5	7.94	8.2	7	WTP/Day - 1 Network/week - 3		907
	Free Chlorine Residual	Target 0.2 - 5mg/L	1.12	5	0.2			908
	Turbidity	Less than 5 NTU	0.45	3.91	0.07			910

5 Compliance with Annual E.coli Rolling Annual Value

5.1 Compliance with Annual E.coli Rolling Annual Value - Bell

Drinking water scheme: BELL Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*41*	*39*	*57*	*43*	*40*	*41*	*39*	*38*	*38*	*49*	*45*	*36*
No. of samples collected in which E. coli is detected (i.e., a failure)	*0*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*0*	*0*	*0*
No. of samples collected in previous 12-MONTH period	*342*	*344*	*360*	*379*	*403*	*430*	*450*	*477*	*492*	*504*	*509*	*506*
No. of failures for previous 12-MONTH period	*2*	*2*	*2*	*2*	*2*	*2*	*3*	*3*	*2*	*2*	*2*	*1*
% of samples that comply	*99.4%*	*99.4%*	*99.4%*	*99.5%*	*99.5%*	*99.5%*	*99.3%*	*99.4%*	*99.6%*	*99.6%*	*99.6%*	*99.8%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.2 Compliance with Annual E.coli Rolling Annual Value - Chinchilla

Drinking water scheme: CHINCHILLA Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*33*	*36*	*31*	*36*	*34*	*31*	*40*	*32*	*33*	*37*	*38*	*34*
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	*361*	*364*	*365*	*383*	*385*	*397*	*411*	*394*	*398*	*407*	*412*	*415*
No. of failures for previous 12-MONTH period	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.3 Compliance with Annual E.coli Rolling Annual Value - Condamine

Drinking water scheme: CONDAMINE Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*19*	*22*	*18*	*18*	*21*	*21*	*19*	*20*	*18*	*20*	*20*	*16*
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	*189*	*200*	*207*	*210*	*211*	*216*	*219*	*230*	*228*	*231*	*234*	*232*
No. of failures for previous 12-MONTH period	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.4 Compliance with Annual E.coli Rolling Annual Value - Dalby

Drinking water scheme: DALBY Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*28*	*32*	*28*	*27*	*24*	*18*	*21*	*19*	*16*	*21*	*17*	*15*
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	*255*	*270*	*276*	*283*	*283*	*281*	*281*	*277*	*273*	*282*	*278*	*266*
No. of failures for previous 12-MONTH period	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.5 Compliance with Annual E.coli Rolling Annual Value - Jandowae

Drinking water scheme: JANDOWAE Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*27*	*29*	*26*	*31*	*34*	*40*	*29*	*32*	*27*	*21*	*26*	*26*
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	*301*	*291*	*297*	*304*	*310*	*329*	*332*	*344*	*348*	*345*	*344*	*348*
No. of failures for previous 12-MONTH period	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*99.7%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.6 Compliance with Annual E.coli Rolling Annual Value - Miles

Drinking water scheme: MILES Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*20*	*22*	*20*	*20*	*15*	*15*	*19*	*21*	*14*	*15*	*16*	*11*
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	*142*	*143*	*149*	*169*	*178*	*179*	*198*	*203*	*211*	*219*	*215*	*208*
No. of failures for previous 12-MONTH period	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.7 Compliance with Annual E.coli Rolling Annual Value - Tara

Drinking water scheme: TARA Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*18*	*18*	*22*	*20*	*32*	*28*	*20*	*20*	*10*	*13*	*8*	*11*
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	*142*	*156*	*165*	*176*	*199*	*220*	*229*	*234*	*231*	*237*	*222*	*220*
No. of failures for previous 12-MONTH period	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.8 Compliance with Annual E.coli Rolling Annual Value - Wandoan

Drinking water scheme: WANDOAN Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*18*	*7*	*3*	*7*	*13*	*1*	*3*	*16*	*8*	*8*	*12*	*0*
No. of samples collected in which E. coli is detected (i.e., a failure)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
No. of samples collected in previous 12-MONTH period	*87*	*70*	*57*	*60*	*66*	*51*	*52*	*68*	*76*	*84*	*96*	*96*
No. of failures for previous 12-MONTH period	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

5.9 Compliance with Annual E.coli Rolling Annual Value - Warra

Drinking water scheme: WARRA Verification Monitoring Results 2023 - 2024												
	Jul	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	*22*	*21*	*22*	*22*	*23*	*22*	*25*	*24*	*16*	*17*	*26*	*25*
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	*270*	*268*	*266*	*270*	*270*	*271*	*273*	*276*	*269*	*263*	*265*	*265*
No. of failures for previous 12-MONTH period	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
% of samples that comply	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Compliance with 98% annual value	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*	*YES*

7 Incidents reported to the Regulator

The incidents reported to the regulator and management actions undertaken over the 2023 - 2024 year are provided in this section.

Table 71 - Incidents Reported to the Regulator

Scheme	Report No.	Incident	Sample Location	Sample Date	Date Reported	Follow Up Sample Date/Actions		Incident Closed Date
Bell	DWI-480-23-10421	Loss of Supply			22/09/2023	Initial Notification email sent 25.09.2023 Notification Investigation Report email sent 13.10.2023	**CLOSED**	15/01/2024
Bell	DWI-480-23-10433	High Chlorine	Clear Water Reservoir	29/09/2023	29/09/2023	Initial Notification email sent 03.10.2023 Notification Investigation Report email sent 13.10.2023	**CLOSED**	23/11/2023
Bell	DWI-480-23-10435	Missed Sampling			29/09/2023	Initial Notification email sent 13.10.2023 Notification Investigation Report email sent 13.10.2023	**CLOSED**	16/10/2023
Chinchilla	DWI-480-24-10830	TTHM	Gaske Lane	29/01/2024	08/02/2024	Initial Notification email sent 09.02.2024 Investigation Notification email sent 17.06.2024 Notification Investigation Report (SIGNED) email sent 18.06.2024	Open (Resolved)	Resolved NOT Reviewed
Condamine	DWI-480-23-10673	Potassium Permanganate Dosing	WTP		18/12/2023	Initial Notification email sent 18.12.2023	**CLOSED**	17/05/2024
Condamine	DWI-480-23-10737	Chlorate	WTP	29/11/2023 13/12/2023	22/12/2023	Initial Notification email sent 22.12.2023	**CLOSED**	16/05/2024
Condamine	DWI-480-23-10738	TTHM	Final/Pioneer Park	13/12/2023	22/12/2023	Initial Notification email sent 22.12.2023	**CLOSED**	16/05/2024
Condamine	DWI-480-23-10739	DCAA / TCAA	Final/Pioneer Park	13/12/2023	22/12/2023	Initial Notification email sent 22.12.2023	**CLOSED**	16/05/2024
Condamine	DWI-480-24-10986	TCAA	Bell Park	17/04/2024	09/05/2024	Initial Notification email sent 10.05.2024 Notification Investigation Report email sent 05.09.2024	Open (Resolved)	Resolved NOT Reviewed
Dalby	DWI-480-24-10848	Chlorate	Clear Water Reservoir	06/02/2024	16/02/2024	Notification Investigation Report email sent	**CLOSED**	15/05/2024
Jandowae	DWI-480-24-10592	TTHM	Rotary Park Hospital Hospital Bowls Club Bowls Club Bowls Club	13/11/2023 13/05/2024 19/06/2024 15/07/2024 07/08/2024 15/10/2024	22/11/2023 31/05/2024 04/07/2024 26/07/2024 03/09/2024	Initial Notification email sent 23.11.2023	Open	
Jandowae	DWI-480-23-10672	High Chlorine	LLR - Retic Network	18/12/2023	18/12/2023	Initial Notification email sent 18.12.2023 Notification Investigation Report email sent 22.12.2023	**CLOSED**	12/01/2024

Scheme	Report No.	Incident	Sample Location	Sample Date	Date Reported	Follow Up Sample Date/Actions		Incident Closed Date
Jandowae	DWI-480-24-11004	Missed Sampling (Turbidity)	WTP	06/05/2024 07/05/2024	24/05/2024	Initial Notification email sent 24.05.2024 Notification Investigation Report email sent 13.09.2024	Open (Pending)	Resolved NOT Reviewed
Miles	DWI-480-24-10916	Turbidity			19/03/2024		Open (Resolved)	Resolved NOT Reviewed
Miles	DWI-480-24-11016	Missed Sampling (Verification Monitoring)	Various	01/01/2024	14/06/2024	Initial Notification email sent 17.06.2024 Notification Investigation Report email sent 21.08.2024	Open (Pending)	Resolved NOT Reviewed
Tara	DWI-480-23-10725	Missed Sampling	Network	20/12/2023	20/12/2023	Initial Notification email sent 22.12.2023	**CLOSED**	17/05/2024
Tara	DWI-480-24-10837	Chlorate	(Final) Test Point 8	24/01/2024	12/02/2024	Initial Notification email sent 13.02.2024 Notification Investigation Report email sent 19.06.2024	Open (Resolved)	Resolved NOT Reviewed
Tara	DWI-480-24-10844	High Chlorine	Test Point 8 (exit Low Level Res)	15/02/2024	15/02/2024	Initial Notification email sent 15.02.2024 Notification Investigation Report email sent 27.02.2024	**CLOSED**	17/05/2024
Tara	DWI-480-24-10915	High Chlorine	WTP, Water Tower, Showgrounds, Standpipe, Brumby Park	19/03/2024	19/03/2024	Initial Notification email sent 20.03.2024 Notification Investigation Report email sent	Open (Resolved)	Resolved - Review Complete
Tara	DWI-480-24-10940	Missed Sampling	Network (Retic)	01/03/2024	03/04/2024	Initial Notification email sent 03.04.2024 Notification Investigation Report email sent 11.09.2024	Open (Pending)	Resolved NOT Reviewed
Tara	DWI-480-24-10998	Missing Data	Various	17/04/2024	10/05/2024	Initial Notification email sent 13.05.2024 Notification Investigation Report email sent 11.09.2024	Open (Pending)	Resolved NOT Reviewed
Tara	DWI-480-24-11009	High Chlorine	Standpipe		03/06/2024	Initial Notification email sent 04.06.2024 Notification Investigation Report email sent 21.08.2024	Open (Resolved)	Resolved - Review Complete
Wandoan	DWI-480-24-10838	Chlorate	Final Water	29/01/2024	12/02/2024	Initial Notification email sent 13.02.2024 Notification Investigation Report email sent 15.07.2024	**CLOSED**	3/09/2024
Warra	***DWI-480-22-09774***	***TTHM***	***Best Park School Highway Gardens WTP***	***07/09/2022***	***20/09/2022***	***Notification Investigation Report email sent 31.05.2024*** ***<u>NOTE:</u> This incident was opened in 2022 and continued to be active until 31/05/2024 when Investigation Report was lodged, therefore relevant to this Report for the 2023-24 FY.***	***Open (Resolved)***	***Resolved NOT Reviewed*** ***(Resolved this FY)***

8 Customer complaints

WDRC received 31 complaints relating to water quality during 2023 - 2024

Table 8-1 - Customer Complaints - Water Quality

Scheme	Health concern	Dirty water	Taste and odour	Other
Bell			1	
Chinchilla		23		
Condamine				
Dalby		7		
Jandowae				
Miles				
Tara				
Wandoan				
Warra				
Total	0	30	1	0

9 DWQMP review outcomes

All sections of the Drinking Water Quality Management Plan were reviewed during 2023-2024.

Specific Amendments listed below.

At the completion of this Annual Report; the Regulator had not approved the DWQMP review.

Table 9-1 - Review Amendments

Amendment	Detail
1. Details of infrastructure for providing the service	Warra - 3.1.10 - Aerator in T3, and varispeed pumps fitted. Condamine - 3.1.4 - Potassium Permanganate added. Tara - 3.3.4 - New hypochlorite dosing point (occasional use).
2. Identify hazards and hazardous events	Minor changes only
3. Information gathering – water quality and catchment characteristics	Minor changes not a complete update
4. Assessment of risks	Condamine - Potassium Permanganate Overarching - Inclusion of PFAS and BGA. 3.6.3.1 - Inclusion of ALARP
5. Risk management measures	Risk management measures updated on all schemes to show progress on filtration and free chlorine online monitoring equipment installation. Other minor wording changes.
6. Operation and maintenance procedures	Overarching 4.1 - Updated Procedures list.
7. Management of incidents and emergencies	Updated contacts lists. Updated list of historical incidents.
8. Risk management improvement program	Updated RMIP to reflect latest progress and program.
9. Service wide support – information management	Minor changes. SWIM replaces Excel spreadsheets.
10. Operational monitoring	CCP's on all schemes - Updated wording in Chlorination - Response to "High" FRC event. 'Increase' chlorine dose was changed to 'Decrease' chlorine dose.
11. Verification monitoring	Minor changes only.
12. Other (please detail)	Overarching Table 11 - Customer Complaints table updated.

10 DWQMP audit outcomes

No audit was conducted during the reporting period 01/07/2023 - 30/06/2024.