WESTERN DOWNS REGIONAL COUNCIL

Drinking Water Quality Management Plan (DWQMP)

Annual Report 2019/2020

OUR COMMUNITIES | OUR FUTURE

Drinking Water Quality Management Plan Report

Western Downs Regional Council

SPID: 480

2019 - 2020	
Details	Information
SPID	480
Postal Address	PO Box 551 DALBY QLD 4405
Telephone	07 4679 4000
E-mail	info@wdrc.qld.gov.au
Water Supply Schemes	Bell Chinchilla Condamine Dalby Jandowae Miles Tara Wandoan Warra

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

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1 Introduction

This is the Drinking Water Quality Management Plant (DWQMP) report for Western Downs Regional Council (WDRC) for the financial year 2019 - 2020.

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 activities undertaken over the financial year 2019 - 2020 in operating our drinking water services
- Drinking water quality summary
- Summary of our performance in implementing our approved DWQMP

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.

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 2019-2020 WDRC provided 3,219ML of potable water to more than 10,482 connections and maintained over 395km 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 1 – Summary of schemes

	Water Source	*Treatment processes*	*Treatment capacity*	*Towns supplied*
Bell	Surface water - Koondaii Dam Ground water - Koondaii Bore x 2 Racecourse Bore (Emergency Supply Only) Warmga Bore	Bell WTP - Aeration, flocculation, sedimentation, filtration, carbon dosing	0.35ML/day	**Bell**
Chinchilla	Surface water - Chinchilla Weir (Condamine River)	Process comprise, 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	**Chinchilla**
Condamine	Surface Water - Condamine Weir	Condamine WTP -	0.5 ML/day	**Condamine**

	Water Source	*Treatment processes*	*Treatment capacity*	*Towns supplied*
		Activated carbon *(if required)*, flocculation, clarification, filtration, disinfection.		
Dalby	Surface Water - Loudoun Weir on Condamine River	Dalby Water Treatment Plant 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-cartridge filtration, single stage RO, air stripping, blending, disinfection, fluoridation.	10.8 ML/day	**Dalby**
	Ground water - Alluvial 'A' Bores Alluvial 'B' Bores			
Jandowae	Surface water - Jandowae Dams	Jandowae WTP - Aeration, flocculation, clarification, filtration, pH adjustment	0.56 ML/day	**Jandowae**
	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	**Miles**
	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	**Tara**

	Water Source	*Treatment processes*	*Treatment capacity*	*Towns supplied*
	Groundwater - Tara Bores 1 & 2	Tara RO Plant - Pre-treatment - chloramination, 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	**Wandoan**
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	**Warra**

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 2019/2020, is divided into the following categories:

1. Process Review Program
2. Reservoir Inspection Program
3. Risk Management Improvement Program

The following tables highlight the work undertaken within 2019/2020 for each of the programs.

Table 2 - Process Review

Process Review																				
Date	Plant	Review Team	Purpose of Review Routine / Full / Special	Internal Test Data	Standard Chem. Analysis	Microbiological Report	SCADA Trends	Flow & Power Logs	Network Testing	Chemical Usage Records	Maintenance Records	Calibration Logs	Customer Complaints	Operators Log Book	Online Process Log	Other	Review Undertaken Online/ Plant visit	Comments	Actions & Responsibility
29/07/2019	Wandoan WTP	Terry Fagg, Craig Tomlinson, Daniel Haslop	Routine Partial Review	☐	☐	☐		☐								Partial Review	Plant Visit	Plant running satisfactorily. Significant concentrations of algae in oxidation & flocculator tanks. Air Valve leaks on the medium filters. Free Chlorine levels, although ok were trending towards low. Network levels ok. High aluminium levels had been resolved since last review. Preparation for reservoir cleaning has indicated potential valving/ pipework defects.	1. Algae to be removed & plant operated with small dose of permanganate or chlorine. 2. Free Chlorine trends to be altered & actions documented. 3. Valving & manifolds issues to be resolved as part of the reservoir cleaning project.
31/07/2019	Tara WTP	Terry Fagg, Anthony Schrag, Rheed Klaproth	Routine	☐	☐	☐			☐					☐			Plant Visit	RO plant operating ok. Surface plant about to come online after long period offline. Lagoon very low, foot valve has been replaced. Network chlorine levels 2.0 mg and has been difficult to control. Chlorine demand test on surface plant indicates the current pump may not have the adequate chlorine dosing capacity. This has been masked in the past by using the RO hypo pump to subsidise the surface plant. A temporary pump has been sourced & installed.	1. Surface plant to be operated & carefully monitored chlorine in reservoir to be regularly checked. 2. "Post" hypo pump to be IP rated. 3. "Post" hypo dose sample to be installed. 4. Procedure for sampling & monitoring to be developed. 5. Intake pipe and jetty to be redesigned/ replaced. Existing jetty has rotted out & is unsafe.

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28/08/2019	Dalby RO2&RO3	Terry Fagg	Routine														Plant Visit	RO2: Permeate flow rate was down to 18.2 L/sec. Increased system pressure pump speed from 67-72% 4 rebalanced. Array 1/ Array 2 flows on vetatmeter by reducing Array 2 boost from 115 to 111%. Array 1 differential increased to about 305KPA so therefore RO2 will need a CIP soon. CIP frequency is increasing with time between CIP; down to approximately 40 days. Backwash of media filters and full plant antimicrobial is indicated. There is no record of bag/cartridge filter changes since March 2019 although pressures are okay. Filters must be close to the end of mechanical life if failure has not already occurred. Last CIP log available for July 2019 but no others. Ro3: Train 1 cartridge filter requires replacement. Calibrations not checked	1. Replacement at RO2 bag & cartridge filters as part of imminent CIP & full plant antimicrobial. 2. RO3 T1- Cartridge change. 3. Water leak on RO2 vetamemter to be repaired. 4. Plant RCD's are overdue for test. 5. Plant needs general clean up. 6. Scale to be removed from seal area at RO3 T2 feed pumps.

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24/06/2019	Chinchilla WTP	Terry Fagg	Routine														Plant Visit	Instruments were repaired & calibrated in previous week by HACH. Online chlorine monitor is offline due to safety concerns. Water quality from plant generally good, low turb, PH very steady, but chlorine on the high side with 1.0 & around the network. UV units recently cleaned but units are regularly faulting out; suspect a wiper unit failure. TMP's are trending high - Train 2 after a succession of MC failure. Despite several back to back CIP with both acid & caustic, no major pressure reductions have been achieved. Excessive sludge & water continue to be a problem. Poly dose unit is not working properly.	1. UV unit to be investigated and repaired. 2. Poly dose unit to be repaired and polymer to be introduced into flash mixer, to reduce sludge volume. 3. Flash mix PH to be lifted to about 6.3 to improve alum solubility. Enhanced coagulation operation not required any longer. Alum dose should be retested 4. Water & sludge management to be given high priority. 5. CIP RC to be performed on T1. Use citric 6. CIP RC in T2 to be performed with both cleaned back to back 7. Progress at MC to be monitored in both trains 8. Chlorine CCP set points to be lowered to 2.0-3.0 as desirable range.
7/08/2019	Condamine WTP	Terry Fagg															Plant Visit	Checked that plant had shut down on turb after sludge had risen clarifier. Treated water turb was about 1. Filtered water turbs 0.34 NTU. Chlorine 1.5	1. Continue to monitor reservoir turbidity's

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7/08/2019	Jandowae WTP	Terry Fagg, KW, Anthony Schrag Len Beck	Routine													Pesticide	Plant Visit	Safety issues; Chem uploading pipework's & sump to be modified to prevent splashing. Ammonia to be modified to have a separate drain. "SDS" & warning labels on chem tanks are inconvenient. Refer to manufacturers SDS. Turb meter time adjusted. Clarifier ladder has potential to cause abrasions if using 'Pelican Hooks'. No suitable harness at plant. Current problems with sludge valves. Manual dumps to be performed. Flow switch that controls chlorine cut is faulty. Currently operating on time. Time to be set up so that chlorine comes in as plant starts. Plant performance is okay. Turb, chlorine, cool, conductivity is okay. Backwash 11-14 days.	1. Ascend harness to be supplied and used. 2. SDS & tank labels to be supplied & attached 3. Flow switch to be repaired 4. Log sheet to have No/Yes 5. Dose pump spares to be resolved. If they are repairable get them repaired or if not dispose of them. 6. Sludge values to be replaced/repaired

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7/08/2019	Warra WTP	Terry Fagg, KW, Anthony Schrag	Routine		☐	☐						☐		☐			Plant Visit	Skid offline is being backwashed rather than "preserved". Sometimes x3. Plant generally running okay with low treated water turbidity. Ongoing issues with keeping permanganate dosing performing correctly. Uncertainty around which bag filters are being used, (50 or 100) Hypo in CEB drums old & no longer effective. Calibrations & safety checks way out of date. Safety shower last checked January 19 (records in two places). Calibration reagents out of date. Raw water flowmeter should be in upflow leg. DP209 (hypo pump) faulting. Spare pumps might be available. Long term water leak near CIP tank and outside at sample point. Unsatisfactory storage of PPE & Hypo test kits. Uncertainty whether Citric acid is being used for CIP. Unmarked lab reagents used (conductivity) July 23- High chlorine due to chlorine pump at water tower stuck on. Tower dumped 170E turb monitor with lamp current warning. Whiteboard does not maintain 30 days of records.	1. DP209 repair or change out. 2. Water leaks to be reported 3. Hypo in CEB drums to be replaced 4. Calibrations to be bought up to date 5. Safety inspections to be bought up to date 6. Reagents to be bought up to date. Unmarked removed. 7. Raw water flowmeter relocated. 8. CIP records to be reviewed 9. PPE to be stored correctly 10. Offline skids to be preserved 11. 1720E turb lamp to be replaced 12. Whiteboard to be correctly updated
7/08/2019	Miles RO	Terry Fagg, Craig Tomlinson									☐						Plant Visit	Checked issues around pre chlorination of bore water 7 bag filter fouling. Bore tank 1.0 total & 0.4 mg/L free at a dose of 0.6L/hour. Dose pump not shutting off with plant, so it's turned off at end of shift. This was modified.	1. Check that pump is now turning on/off with cooling pump. 2. Reduce hypo close until negligible free chlorine is detected. 3. Front end soak in chlorine/DBNPA required

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29/08/2019	Miles WTP	Terry Fagg, Anthony Schrag	Routine														Plant Visit	Water quality generally good. Variations in chlorine tests with results in network & reservoir sometimes higher than at the treatment plant. Magnasol 58 is now being used in place of Ultrion 44560 (cheaper product). Data up to date. Differential pressures on RO- 237KPA. CIP only a week ago. Spectraguard antiscalant (Menguard gas) been supplied. Chemical bunds have deteriorated due to leaks etc. Ultrion & calcium chloride tanks hatches to be replaced. Ultrion tank needs to be screened. Caustic soda pumps & fittings leaking. No method to check tank levels/usage. Corrosion in the wall of closing shed. Kick boards on clarifier developing rust. Standby heat exchange to be reassembled & packed up. Bore tank & permanent tank leaking. Hypo dosing of bore water has changed medic filter performance. Backwashes required regularly. Cartridges & bags 5 days/2 days gradually improving.	1. Ultrion tanks & others to be fitted with site glass or opaque tanks. 2. Bunds to be repaired/ recoated. Sump to be considered. 3. Kickboards to be repaired/replaced 4. Bore & permeate tank to be repaired/replaced 5. Backwash twice a week to continue 6. Low dose hypo into bore tank to continue. 7. Remove plants out of small clarifier. 8. Run g set.

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12-Sep	Tara WTP	Terry Fagg, Len Beck, RV,SL	Routine														Plant Visit	Surface plant stating to carry over sludge. Reduced flow rate through plant 5.5-4.5 L/sec. Sludge clumping irregularly for long time 60secs/40 mins. Changed to 30 secs/20 mins. Cartridges heavily bio-fouled on RO. Changed to UF plant blend rather than break tank blend. Reduced flow through filtered water turbidity monitor. Turned off sample taps when not in use. 8182 dose rates to be checked to attempt to improve sludge settle-ability.	1. 8182 rate to be checked & increased if necessary 2. Plant flow rate to be monitored. 3. Sludge thickness to be monitored over time 4.Other actions implemented immediately. 4(a) Sludge density maybe thinner than usual contributing to the need to slow the plant down. 4(b) Turbidity removal is reasonable however, the 8182 flow rate should be checked & tested at a slightly higher rate to test if an improved sludge density can be achieved. 4(c) The sludge settled volume should be monitored regularly to see if this is an increasing or decreasing trend & may inform the sludge draw off rates. 4(d) Plant flow had to be reduced to prevent sludge carry over but optimising 8182 dose & getting sludge draw off correct may offer the opportunity to increase the flow rate slightly.

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17-Oct-19	Jandowae WTP	Terry Fagg, Anthony Schrag, Len Beck	Routine														Plant Visit	Protective cap to be placed on steelwork near filters. Fans to be replaced & extra filters in filter pump panel. Existing for faulty. Flow control or rain flow is difficult to maintain at constant rate. MARIC value to be replaced. No2 lagoon supernatant tested-to be returned to the dam. Calibrations are generally up to date but need to be completely checked. Safety inspections up to date. Trend white board up to date. Adequate chemicals on hand. Problems being experienced with gas locking at chlorine pump. Lots of variations in settled water turbidity, with recent dose rate changes to improve this. High turbidity (1500 FNTU) in rainwater, and changes in rainwater flow related to the MARIC value is pushing the plant design close to the limit of capability.	1. Fans to be replaced & extra installed in filter-pump panel. 2. Steel work near filter pump panel to be protected. 3. MARIC value to be replaced to give improved flow control. 4. Close monitoring of turbidity in settled water required. May require regular testing.

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15.10.19	Chinchilla WTP	Terry Fagg	Routine														Plant Visit	Train 2 passing IMIT, but still to be pinned. Overall plant water quality good with turbidity. PH & chlorine very consistent PH 7.5 chlorine 1.8MG/L Turbidity 0.1-0.2. Fluoride is acceptable but not so well controlled. TMPs had been gradually creeping up as were backwash TMPs. Some TMPs were not controlled by MC or RC indicated permeate sludge scaling. Many instruments have no record of recent calibration. No record of previous UV cleaning. Operator process logbook records last RC as 3.9.19. Constant run under load 17.9.19. CIP hot water system being installed today. Permeate side CIP being performed train 2 today. TMP reduced from 80 to 66KPA. E. coli incubator running at 40 degrees instead of 35-37. Torque sensor to be repaired on Lamella scraper. No2 Raw water pump to be repaired.	1. No2 Raw water pump to be repaired. Pumps 1 & 3 to be inspected for intake fouling. 2. Instrumentation calibrators to be brought up to date & recorded. 3. Torque sensor to be repaired on lamella. 4. RC performed on both trains. 5. Train 2 membrane leak to be pin repaired.
4.10.19	Miles RO	Terry Fagg, Craig Tomlinson	Routine														Plant Visit	Brief overview of plant operations particularly the RO. Bag/cartridge change frequency has reduced. Cooling tower-overflowing-cooling water outside specification-PH above 8.0. Free chlorine above 1.0MG/P intermittently. Bore air valve leak. RO plant performance okay.	1. Bore air valve to be repaired 2. Cooling tower folat valve replaced-this may assist with chemical stability. 3. Hypo dosing of bore water to be continued/

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10.10.19	Dalby RO2	Terry Fagg, PP	Routine													CIP logs and daily log sheets	Plant Visit	Ro2 had just been cleaned but differentials on the first stage were still high 300KPA. Plant had been pushed too long. Discussed cleaning strategy. Hypo 2 & Caustic still being operated a manual due to failure in new control system.	1. Lavasoll II 2. 15kg MC11 3. Caustic to PH 12 4. 35 degrees
28.10.19	Dalby WTP-Surface Water Plant	Terry Fagg	Special-Check River OPS														Plant Visit	RO1 off due to flange failure. Surface plant had operated 10-12hr shifts x2 on previous days. Witnessed backwash-dirty then clean, about 40ntu at end of backwash. Backwash reclaimed. Settled water channels had large build of floc and rubbish & poses a major quality problem if channel drains down. Checked Alum dose based on pump settings-213mgLl. Raw turbidity is 47 NTU. Dosed water ph 6.2 Dosed water alkalinity about 70. Raw water alkalinity 140. Settled water turb 1.25 Filtered 0.21 NTU. Backwash rate control valve stuck shut. Dose rate for caustic &alum have been made but not properly documented. Caustic to flash mix 4.5mg/L. Based on alkalinity loss Raw/settled alum dose rate is about 140mgl. Jan test indicates alum dose could be reduced by 10% & results would still be satisfactory. Flash mix caustic may of be needed.	1. Confirm alum pump dose rate 2. Sodium hydroxide tank fill line in bund to be repaired. 3. Clean out settled water channels & dose clarifiers with Captrol or shut down. 4. Ensure that all dose rate changes are properly documented in the log sheets. 5. Air valve or rising main isolated and should be located or an offset, so leakage is not onto structure. 6. Backwash rate control to be fixed and backwash turbs checked against <20NTU standard at end.

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31/10/2019	Tara WTP	Terry Fagg, Anthony Schrag and Sophia Lem	Routine														Plant Visit	Multiple Issues 1. The RO plant was CIP'd on the 11/10/19 but did not need it. Previous recorded CIP August 2019. For two days prior to the 21/10/19 the UF operated so poorly that it produced inadequate water to feed the RO which caused a shutdown every hour. 2. The air compressor was running continuously due to a major air leak from AVIOI was full of oil and water and had been faulty for some time. The piston and bore were badly scored. Changed over the actuator from AV607 to get by. Drained out compressor tank & flushed lines. AV101 t be replaced. Air down lines not installed as requested in April 2019. 4. RO antiscalant tank build up of black slime scaling 5. Floating sludge on flocculator. 6. 8182 tank scum on surface. 7. High viz label missing from Cal Chlor tank 8. A lot of rust developing in the filter tank & bolts etc 9. No UPS or any plant computers 10. Operational comments in daybook are not adequate. Electronic process log not too bad though. All activities to be initialled. 11. Special RO tests to be completed. Already overdue 12. Chlorine in neutral generally high at 1.5t at reservoir exit. A level of 1-1.5 at reservoir exit is adequate to give satisfactory residuals	1. Solar panels to be cleaned. 2. UPS systems to be obtained & installed 3. Air compressor daily hours to be recorded & monitored. 4. Spare valves & actuators to be purchased to replace AV101 & have spares on hand 5. Flocculator, clarifier, 8182 & antiscalant tanks all need to be drained and cleaned out. 6. Filter needs maintenance rusted bolts etc. 7. Calcium chloride tank to be labelled 8. More details of events actions etc to be entered in operators daybook. 9. RO sampling and testing to be organised & completed. 10. Chlorine residuals need to be better managed aiming at consistency around 1.0 post reservoir. 11. Airline drains end blow down drains to be installed & used. 12. Previous process review "Actions" to be implemented. 13. Process to be better monitored & actions taken when the process is operating poorly. If remedial action is not understood, at least seek assistance.

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																		chlorine is not being managed adequately. All calibrators were checked but those checked were okay. Surface water filtered water turbidity was trending high.	

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31/10/2019	Tara WTP	Terry Fagg, anthony Schrag, AD, Len Beck	Routine														Plant Visit	Plant operating okay but indicators of trending to poorer performance. Sludge withdrawal not possible. Large patches of weeds growing in oxidation ponds. Trails of bubbles in Imhoff tank. No wall scraping or slot cleaning occurring. Heavy crust build up on gas vents. Sludge withdrawal blocked. Cap on rodding opening has a smaller threaded outlet welded on. Gate has been left open for water truck access. Rags buried on site.	1. Sludge withdrawal to be unblocked. Welded cap removed. Use a plunger on rodding pipe. 2. Reeds to be sprayed out and removed 3. Gate to be locked. Water trucks must have own locks. 4. Wheelie bin service to be investigated for rag collections. 5. Weekly Imhoff tank scraping & slot cleaning to be implemented. 6. Gas vent crust to be manually removed.
14/11/2019	Jandowae WTP	Terry Fagg,Anthony Schrag,Len Beck, Leesa Giles, Ray Johnston															Plant Visit	Check on process performance due to increasing turbidity & declining settled & filter performance. Jan tested a number of combinations of alum 3265 & Ultrion 44560. Ultrion at 80ng/L proved to give good performance, better than after calibrations.	Obtain 40L of Magnasol 589 from Miles to trial for at least one complete plant turnover. If successful, operate on 589.

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4/11/2019	Wandoan WTP	Terry Fagg and Anthony Schrag	Routine														Plant Visit	Plant operating okay. Heavy build-up of algae in flocculator & lamella but pre hypo dose pump is operating but not dosing. Pre-Potassium-Permanganate pump not connected. Plant results on whiteboard not up to date. Equipment that was reviewed had correct calibration. Some data missing from tables, some missing from log sheets, generally not the same. Micro bottle not labelled correctly. Needs time of collection, operator initials, chlorine & pH readings on all bottle. Micro log sheet is good, however. Damaged to floor in MCC doorway- potential safety issue. Solar panels reasonably clean. Office needs cleaning. UPS tested. Fans & filters etc need cleaning. Cooling tower preventative mtce records indicate no inspection since May 2019. VFD drives need mtce. Pumpstations to be cleaned out. Mowers removed. Switchboard cleaned out. No 1 Bore to be repacked and repaired urgently. Lab safe to be repaired or removed.	1. VFD & switchboards maintained cleaned. Mowers & garbage removed. UPS to be cleaned. 2. No 1 bore to be repacked 3. Cooling tower to be inspected. 4. Micro bottles to be labelled correctly (name, PH, chlorine, location, time and date) 5. Hypo & permanganate pumps to be overhauled/replaced & hypo dosing to oxidator tank resumed. 6. Repair to MCC room floor to be investigated budgeted. 10. Whiteboard to be updated.

Process Review																				
Date	Plant	Review Team	Purpose of Review Routine Full Special	Internal Test Data	Standard Chem. Analysis	Microbiological Report	SCADA Trends	Flow & Power Logs	Network Testing	Chemical Usage Records	Maintenance Records	Calibration Logs	Customer Complaints	Operators Log Book	Online Process Log	Other	Review Undertaken Online/ Plant visit	Comments	Actions & Responsibility
4.11.19	Miles WTP	Terry Fagg, Anthony Schrag, Craig Tomlinson and Daniel Haslop	Routine														Plant Visit	Surface & RO plants operating okay. Chlorine, turb & pH okay; Big caustic leak on outlet ball valve. RO heat exchange needs dismantle to clean out. Float valve on cooling tower has been fixed. Sludge handling is going okay but may need another geotube. Antiscalant tank to be drained & cleaned out. Caustic system has leaks on tank & dose pumps. Whiteboard up to date. Small clarifier needs to be drained & cleaned. Settled water turbidity missed, last HACH service & needs calibration. Chemical bunds on filter plant in poor condition. Chlorine, pH, Conductivity & Turb generally okay. Plant whiteboard appears up to date & indicates almost straight line for PH but some variance on chlorine.	1. Heat exchange to be cleaned & investigated (done) 2. Small clarifier drain & cleanout 3. Antiscalant tank to be cleaned out 4. Caustic leaks to be repaired 5. Chemical bunds to be budgeted for repair 6. Reservoirs still to be inspected. 7. Genset to be run & staff trained on its operation 8. Plant UPS to be tested.
19.11.19	Tara WTP	Terry Fagg														Minor	Plant Visit	General operation okay. RO plant was operating at excessive recovery. This was readjusted - must be a minimum of 1L/sec concentrate flow. Ex reservoir hypo dosing/residuals still subject to fluctuations. Dosing with 2 plants & 2 dose pumps and the inter relationship is not well understood.	Training & reinforcement of chlorine dosing& interactions between the two plants.

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Process Review																				
Date	Plant	Review Team	Purpose of Review Routine Full Special	Internal Test Data	Standard Chem. Analysis	Microbiological Report	SCADA Trends	Flow & Power Logs	Network Testing	Chemical Usage Records	Maintenance Records	Calibration Logs	Customer Complaints	Operators Log Book	Online Process Log	Other	Review Undertaken Online/ Plant visit	Comments	Actions & Responsibility
4.03.20	Miles WTP	Terry Fagg and Craig Tomlinson	Routine		▯	▯		▯	▯								Plant Visit	RO plant dose was reviewed due to scaling after concentrate valve. Dosage was lifted from 1.8 to 2mg/l in the concentrate 700-770ml/hr. Plans for chem tank bunding was reviewed CaCl & Magnasol on one side. Caustic & hypo on other Cooling tower water quality is variable & on the edge of in-specification. Numerous raw water changes in recent weeks. From 50 to 600 NTU. Plant performing okay. Treating 200Kl/day Surface 500kl/day RO. Sludge centrifuge not run for several weeks. Adequate room for sludge. Chlorine approx. 2mg/l at plant. Adequate 0.8- 1.5 around town. Turb good.	1. RO air-compressor to be repaired. Auxiliary unit being used. 2. Self bunded tank quotes to be obtained. 3. Filter plant refrigerator drier faulty/suspect 4. Concentrate line to be cleaned out. 5. Cooling tower skid to be calibrated/checked 6. RO plant filters to be disinfected to control biofouling 7. Need to change network test schedule to one per day to monitor network chlorine levels.

Process Review																				
Date	Plant	Review Team	Purpose of Review Routine Full Special	Internal Test Data	Standard Chem. Analysis	Microbiological Report	SCADA Trends	Flow & Power Logs	Network Testing	Chemical Usage Records	Maintenance Records	Calibration Logs	Customer Complaints	Operators Log Book	Online Process Log	Other	Review Undertaken Online/ Plant visit	Comments	Actions & Responsibility
16.3.20	Jandowae WTP	Terry Fagg, Anthony Schrag and Len Beck	Special-Follow up after incident														Plant Visit	Water Tower Depot: not secured x2. Sheds & office unlocked/gates. Standpipe: requires backflow prevention. Plant generally operating okay. Sludge levels very different between the two clarifiers. No 1 level low but sludge being drawn off the bottom rather than the cone. Timers set differently + adjustments not clear. Value between res & high service pumps faulty. Feed line to small reservoir requires isolator at WTP end. Last verification test of HACH2100Q turbidity meter 28-1-2020, but many days of use since then. Many drumsat roundup stored in chemical room.2 pails of Fortune 500 stored in chemical room.	1. Coagulation: Pumps to best set up to feed from both tanks 2. Timers on sludge bleeds to be checked against stopwatch. Clarifier 1 may need a different regime 3. Sludge cone to be repaired 4.Value on small reservoir to be repaired/replaced 5.Isolation value on small res feed line to be installed. 6.Clarified water "to waste" to be tested and on pipework modified. 7.Roundup & Fortune to be relocated 8.2100 to be verified calibration regularly/daily. 9."Lock the gate" policy to be reinforced with staff. 10. Backflow device to be filled to truck fill standpipe.

Process Review																				
Date	Plant	Review Team	Purpose of Review Routine Full Special	Internal Test Data	Standard Chem. Analysis	Microbiological Report	SCADA Trends	Flow & Power Logs	Network Testing	Chemical Usage Records	Maintenance Records	Calibration Logs	Customer Complaints	Operators Log Book	Online Process Log	Other	Review Undertaken Online/ Plant visit	Comments	Actions & Responsibility
16.03.20	Jandowae WTP	Terry Fagg,Anthony Schrag,Len Beck	Routine														Plant Visit	Plant operating adequately. Trickle filter distributor not operating effectively. First aid out of date (not inspected) Hypo bulk-i-box sitting outside. Syphon box not working in fill dump mode. Storage containers unlocked. High intensity sprays squirting into gas vents.	1. Distributor to be checked daily & nozzles cleaned as required. 2. Syphon to have small bleed lines blocked & tested 3. First aid kit to be checked at next opportunity 4. Hypo to be stored undercover 5. Containers & sheds secured 6. New boundary signs to be erected.
18.03.20	Miles RO	Terry Fagg, Craig Tomlinson and Phil Andrews														Daily Log Sheets	Plant Visit	Not a full plant review. Plant visited during a maintenance shutdown to perform an antimicrobial clean on front stage of plant.	Bore tank to be cleaned out & sanitised with chlorine. Centre pole to be reinstated. Media filter antimicrobial treatment to be repeated.
12.03.20	Tara WTP	Terry Fagg and Sophia Lem														Daily Log Sheets	Plant Visit	RO plant only online. Surface water plant offline. Performance generally good. 1 week of consistent 1.5mg of chlorine leaving plant. Filtered water turb monitor showing "Dark Warning" fault. Bore bypass line plug to be repaired. Changed over to bore tank-bypass blend line.	Turb monitor to be checked & reset /repaired. Bore bypass line to be capped properly.

Process Review																				
Date	Plant	Review Team	Purpose of Review Routine Full Special	Internal Test Data	Standard Chem. Analysis	Microbiological Report	SCADA Trends	Flow & Power Logs	Network Testing	Chemical Usage Records	Maintenance Records	Calibration Logs	Customer Complaints	Operators Log Book	Online Process Log	Other	Review Undertaken Online/ Plant visit	Comments	Actions & Responsibility
13.5.20	Miles WTP RO Plant	Terry Fagg & Craig Tomlinson	Routine													Citec trends	Plant Visit	Plant had a 2nd stage scaling event in previous week which coincided with a loss of comms event, so some operating parameters are not available. CIP restarted, performance okay but exchange temperature is about 35 degrees. Plant requires extensive antimicrobial, SDI testing to determine if filters are performing adequately. Plant performing okay.	1.Heavy front end antimicrobial to be undertaken. 2. SDI testing of filters 3. Heat exchange overhaul & set up to connect to main plant CIP.

Table 3 - Reservoir Inspection Program

Date of Inspection	Person/s Performing Inspection	Date Reservoir Back Online	Is the fence around the reservoir of a security standard, lockable and normally locked?	Are there any visible leaks on the outside of the reservoir?	Is there visible leakage through underdrains or collection system?	Is the roof structurally sound; is the roof sheeting in place and any ventilators etc working?	Are hatches in place, water tight and lockable?	Do hatches have a raised collar of about 100mm to prevent flow under the hatch?	Is the hatch a shoebox style?	Is rainwater directed off the roof to the outside of the reservoir?	Are all gutters and downpipes etc, clean, in place and in sound condition?	Is the reservoir suitably bird, frog and rodent proofed and are all screens etc in place?	Comments/ Proposed Changes/ Repairs Required	Depth of sediment in reservoir prior to cleaning (cms)	Colour of sediment	Method used for cleaning	How was the tank after cleaning?	Was there anything unusual found in the reservoir during cleaning ?	Was the source of the unusual material discovered and the entry point eliminated?	Comments/ Opportunities for Improvements/ Repairs Undertaken
20/07/2019	External Agent												Small Poly tank 22,500 Litres No ladders High level of sediment.	33						
20/07/2019	External Agent												No ladders. Access hatch very small. No roof platform.	15						
22/08/2019	Terry Fagg Leigh cook Alan Keehn Richard Robinson Phil Andrews	22/08/2019	Y																	
15/07/2019	External Agent												Internal ladder needs replacing. Cage on external ladder to roof would not comply with Australian Standards. Door to platform damaged and not sealed.	20						
16/07/2019	External Agent												Temporary pipe bandage repair to scour still in place. Pipework cracked in clamp above repair. Internal ladder corroded. Access hatch not sealing.	10						
19/07/2019	External Agent												Vent and access hatch both unsealed.	5						

Date of Inspection	Person/s Performing Inspection	Date Reservoir Back Online	Is the fence around the reservoir of a security standard, lockable and normally locked?	Are there any visible leaks on the outside of the reservoir?	Is there visible leakage through underdrains or collection system?	Is the roof structurally sound; is the roof sheeting in place and any ventilators etc working?	Are hatches in place, water tight and lockable?	Do hatches have a raised collar of about 100mm to prevent flow under the hatch?	Is the hatch a shoebox style?	Is rainwater directed off the roof to the outside of the reservoir?	Are all gutters and downpipes etc, clean, in place and in sound condition?	Is the reservoir suitably bird, frog and rodent proofed and are all screens etc in place?	Comments/ Proposed Changes/ Repairs Required	Depth of sediment in reservoir prior to cleaning (cms)	Colour of sediment	Method used for cleaning	How was the tank after cleaning?	Was there anything unusual found in the reservoir during cleaning ?	Was the source of the unusual material discovered and the entry point eliminated?	Comments/ Opportunities for Improvements/ Repairs Undertaken
													Door to upper platform hinges broken.							
17/07/2019	External Agent													2						
18/07/2019	External Agent												Small Poly tank 22,500 Litres no ladders.	3						
22/07/2019	External Agent												Anodes were found on floor, severely depleted. Entry hatch not sealed or locked and the timber frame is rotted.	1.5						
17/07/2019	External Agent												Small Poly tank 22,500 Litres No ladders High level of sediment. Walls were brushed clean by divers to remove buildup of sediment.	25						
17/07/2019	External Agent												Small Poly tank 22,500 Litres no ladders High level of sediment. Walls were brushed clean by divers to remove built up sediment.	25						
29/04/2020	TERRY FAGG/GREG MOXHAM/ JOHN WRIGHT	29/04/2020	Y	N	Y	Y	Y	N		Y	N	Y	Small leak under tank	2						

Table 4 – Risk management improvement program implementation status

Western Downs Regional Council's

DWQMP 16.0 Risk Management Improvement Program

Last Review: 23-Jun-20

Town	Improvement Action No.	Scheme Component	Hazard / Hazardous Event	Priority	Actions	Revised Target Date	Original Target Date	Estimated Cost	Improvement Action Reference	Responsibility	Status	Comments
Dalby	DI 7	Filtration	Turbidity carry over after backwash due to an unusual filter to waste process	High	Monitor filter water turbidity's as filters return to service.	Ongoing	Ongoing	Operational Expense		Operator	Ongoing	
Dalby	DI 10	Alarms	Process problems during attended or unattended operation that cause the plant to produce unsafe water	High	Compile a list of all current alarms and undertake a function test. Repair if necessary.	2022		$10,000		Supervisor	Partially Complete	Work is proposed as part of electrical and control upgrade Stage 2
Dalby	DI 11	Alarms	Process problems during attended or unattended operation that cause the plant to produce unsafe water	High	Undertake an alarm risk assessment based on whole of plant scenario.	2022		Operational Expense		Water Treatment Principal	Partially Complete	Work is proposed as part of electrical and control upgrade Stage 2
Dalby	DI 12	Alarms	Process problems during attended or unattended operation that cause the plant to produce unsafe water	High	Implement alarm system changes based on risk assessment.	2022	2015	$50,000		Water Treatment Principal	Partially Complete	Work is proposed as part of electrical and control upgrade Stage 2
Chinchilla	CHIA 15	Disinfection	UV unit is below the required output increasing the risk of microbial contamination	High	Interim: Operation of system as is and monitor results. Short Term: Further investigations of operation in enhanced coagulation mode to achieve further improvements in UVT%. Long Term: Resolution by capacity upgrades or system improvements	2019	Jul-18	TBA		Supervisor	Completed	UV unit duplicated
Condamine	COIA2	Other (operator skill level)	Water quality event may be beyond operator skill	High	Install off site monitoring systems. System planned but deferred	2020				Water Treatment Principal	underway	SCADA is being installed at time of review June 2020
Condamine	COIA12	Residuals	Poor quality residuals returned to plant which negatively impacts on process	High	Significant chance of negative impact. Installation of supernatant flow meter. Return of supernatant not routinely practiced	2021	2016	$7,000		Supervisor		Supernatant primarily used for recycling.
Miles	MIA 12	Bore	Loss of bore when desal plant is required as only supply source due water quality issues in Gil Weir.	High	Significant chance of negative impact. Another bore to be installed to improve the reliability of the system	Deferred indefinitely	2013	$1.2 million		Utilities Manager	Deferred indefinitely	Council has elected to defer this project indefinitely.
Dalby	DI 9	Disinfection	Disinfection system failure goes undetected	High	Install dosing system monitors on all dose pumps not already so equipped.	2022	2014	$100,000		Water Treatment Principal	Partially Complete	Work is proposed as part of electrical and control upgrade Stage 2
Jandowae	JIA 13	Raw water supply	Pesticides and chemicals in raw water supply	High	Monitor raw water supply for pesticides to establish a greater	Ongoing	Immediate	Operational Expense	DWQMP	Supervisor	Ongoing	

Western Downs Regional Council's

DWQMP 16.0 Risk Management Improvement Program

Last Review: 23-Jun-20

Town	Improvement Action No.	Scheme Component	Hazard / Hazardous Event	Priority	Actions	Revised Target Date	Original Target Date	Estimated Cost	Improvement Action Reference	Responsibility	Status	Comments
					understanding of quantities and types detected-done							
Bell	BIA 12	Chemical dosing	Inadequate or incorrect dosing causes inadequate disinfection and or plant performance.	High	Install dosing monitor, duty standby pumps etc. and linked to future SCADA system	2021	2016	$50,000		Water Treatment Principal		
Bell	BIA 14	Residuals	Poor quality supernatant returned to the head of the plant causing poor performance	High	Based upon regular monitoring of residuals, install flow meter on residuals return	2021	2016	$10,000		Water Treatment Principal		Little or no supernatant being returned. With plant out of service for long periods due to drought work was put off.
Bell	BIA 3	Raw water supply	Changes in raw water turbidity	High	Online monitor to be linked to future SCADA system	2020	2016	$15,000		Water Treatment Principal		SCADA is being installed at time of review June 2020
Condamine	COIA9	Chemical dosing	Incorrect dosing	Medium	Adequate system current exists but could be improved. Install dosing monitoring system Project to be considered as part of future SCADA up grade	2022	2020	$50,000		Water Treatment Principal		Still being considered as part of future plant upgrade to link to SCADA
Warra	WIA 26	Training		High	Training of operators to improve knowledge about their role in the operation of automated plants and the maintenance of water quality.	Ongoing	2005			Supervisor		(Refer to WIA 22)
Warra	WIA 28	Disinfection	Regular detections and exceedance of DBPs	High	Chloramine dosing is proposed as a trail solution. Chloramine system to be installed	System installed but not currently in use.	Jun-18			Water Treatment Principal	Partially Complete	
Bell	BIA 2	Raw water supply	Changes in raw water turbidity	High	Install raw water turbidity monitor	Not going to be done	2014	$20,000		Water Treatment Principal		With plant out of service for long periods due to drought work was put off.
Bell	BIA 4	Rapid mix	Coagulants not mixed correctly	High	Undertake further study on mixing performance	2019	2014	$5,000		Water Treatment Principal		With plant out of service for long periods due to drought work was put off.
Warra	WIA 17	High service pumps	Pumps operating excessively without detection by operators	High	Existing SCADA based hours run meter be modified to record minutes run per day instead of hours run per day.	2019	Jan-16	$3,000		Supervisor	Partially Complete	Improvement to UF Plant
Condamine	COIA4	Filtration	Turbidity carryover into treated water following backwash	High	No filter to waste capability. Investigate filter return to service performance	Deferred indefinitely	2013	$20,000		Supervisor		Unable to install filter to waste capability currently
Condamine	COIA5	Filtration	Turbidity carryover into treated water following backwash	High	No filter to waste capability. Install filter to waste facility Not currently practical to install filter to waste	Deferred indefinitely	2019			Water Treatment Principal		Unable to install filter to waste capability at this time

Western Downs Regional Council's

DWQMP 16.0 Risk Management Improvement Program

Last Review: 23-Jun-20

Town	Improvement Action No.	Scheme Component	Hazard / Hazardous Event	Priority	Actions	Revised Target Date	Original Target Date	Estimated Cost	Improvement Action Reference	Responsibility	Status	Comments
					capability. Needs to be a part of a total review of operations.							
Condamine	COIA6	Disinfection	Inadequate disinfection	High	Total failure likely. Develop system to monitor tank levels. To be added to part of daily reads	2022		$30,000		Supervisor		Improved monitoring in place
Condamine	COIA7	Disinfection	Inadequate disinfection	High	Total failure likely. Install dosing monitoring system Project to be considered as part of future SCADA up grade	2020-	2019	$30,000		Water Treatment Principal		Online monitor to be installed as part of SCADA upgrade.
Condamine	COIA13	Alarms	Treatment process failure is undetected, and plant produces unsafe water	High	No current system. Upgrade the current alarm system to a proper SCADA system. System proposed but deferred to 2019	Partially complete. Will be completed in 2020	2014	$50,000		Utilities Senior Technical Officer	underway	
Regional	RIA 1	Procedures			Update/Develop and implement procedures.	Ongoing	Ongoing	Operational Expense	Audit finding	Utilities Technical Officers	Ongoing	
Regional	RIA 2	Calibration Schedule			Develop and implement a calibration schedule, including instruments, frequency and records	2019		Operational Expense	Audit finding	Utilities Coordinators	Partially complete	
Regional	RIA 3	Procedures			Develop and implement calibration procedure.	2019		Operational Expense		Utilities Coordinators	Partially complete	
Regional	RIA 4	Reservoir Inspection and Cleaning Program			Develop and implement a reservoir inspection and cleaning program. Include frequency and maintenance and repair issues.	Development completed. Operation ongoing		Operational Expense	Audit finding	Utilities Treatment Coordinator Dalby	Partially complete	
Regional	RIA 5	DWQMP Review Process			Develop a DWQMP review process to ensure that the review is documented, and the result recorded and retained. Refer to the DWQMP Review and Audit Guideline (DEWS).	2019		Operational Expense	Audit finding	Water Treatment Principal	Partially complete	A review template has been created using the Audit and Review Guidelines. Location: S:\Engineering Services\Regional Utilities\Documents\Management Plans\Water\Drinking Water Quality Management Plan\DWQMP Review Process
Miles	MIA 13	RO Ponds	Recommendations from Annual RO Ponds Inspection Report			Ongoing				Water Treatment Principal	Ongoing	
Tara		RO Ponds	Recommendations from Annual RO Ponds Inspection Report			Ongoing				Water Treatment Principal	Ongoing	

Western Downs Regional Council's

DWQMP 16.0 Risk Management Improvement Program

Last Review: 23-Jun-20

Town	Improvement Action No.	Scheme Component	Hazard / Hazardous Event	Priority	Actions	Revised Target Date	Original Target Date	Estimated Cost	Improvement Action Reference	Responsibility	Status	Comments
Regional	NIA 5	Network	Pipe bursts, Inadequate repair, Commissioning new mains, flow changes, Inadequate flushing of mains and dead ends, iron or manganese present in water, air in system, corrosion of pipes, cross connection		Develop and Implement network operation and maintenance procedures which includes the following: 1. Disinfection of water mains 2. Valve operations 3. Main flushing 4. Network repairs 5. Water quality monitoring 6. Storage of materials	2019	2013		DWQMP	Utilities Coordinators	Partially complete	
Regional	NIA 6	Network	Sloughing of biofilms	Medium	Investigate mains cleaning options	Ongoing	Ongoing		DWQMP	Utilities Technical Officers	Partially Complete	
Regional	NIA 8	Network	Cross-connection, Cross connection to water supply of uncertain quality eg: bore, tank; greywater system, Toxic chemical enter system through inadvertent cross connection		Develop a database of high risk and special need customers eg: dialysis patients, industries with water critical processes etc.	Ongoing	2015		DWQMP	Utilities Coordinators	Ongoing	
Regional	NIA 11	Network	Pipe bursts, Inadequate repair, Commissioning new mains		Construct/Purchase portable chlorination equipment	2021	2014	$20,000	DWQMP	Utilities Coordinators		Interim equipment and procedures being used. Equipment will be reviewed along with policy and procedures
Regional	NIA 12	Network	Pipe bursts, Inadequate repair, Commissioning new mains, flow changes, Inadequate flushing of mains and dead ends, iron or manganese present in water, air in system, corrosion of pipes, changes in water chemistry		Feedback system to document and report areas/properties etc reporting dirty water, problems with dead ends etc.	2022	2015		DWQMP	Supervisor		Deferred due to change over of Customer management Database.
Regional	NIA 13	Network	Cross connection within a customer's property causing backflow from rainwater tank bore or grey water system into network during low pressure event. Toxic chemicals enter system through inadvertent cross connection		Improved training and certification of authorised persons	Ongoing	Ongoing		DWQMP	Utilities Coordinators	Ongoing	

4 Verification monitoring - water quality information and summary

This section offers the compliance of each scheme with water quality criteria.

4.1 Verification Monitoring: Bell

Scheme: Bell

Population: 360

Connections: 185

Table 5 – Drinking water quality performance - Verification Monitoring - Bell

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Microbiological	E. coli	1 WTP/Month 1 Ret./Month	24	0 mpn/100ml		
	Total Coliforms	1 WTP/Month 6 Ret./Month	24		0	
Pesticides	Ametryn (70)	1 WTP/12 Month	6	70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month	6	20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month	6	400 ug/L	0	
	DEET	1 WTP/12 Month	6		0	
	Desethyl Atrazine	1 WTP/12 Month	6		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Desisopropyl Atrazine	1 WTP/12 Month	6		0	
	Diuron (20)	1 WTP/12 Month	6	20 ug/L	0	
	Fluometuron (70)	1 WTP/12 Month	6	70 ug/L	0	
	Hexazione Hexazinone (400)	1 WTP/12 Month	6	400 ug/L	0	
	Imidacloprid	1 WTP/12 Month	6		0	
	Metolachlor (300)	1 WTP/12 Month	6		0	
	Prometryn	1 WTP/12 Month	6		0	
	N-Butylbenzenesulfonamide	1 WTP/12 Month	6		0	
	Tebuthiuron	1 WTP/12 Month	6		0	
	Simazine (20)	1 WTP/12 Month	6	20 ug/L	0	
	Triethyl Phosphate	1 WTP/12 Month	6		0	
	Tris(Chloropropyl) Phosphate Isomers	1 WTP/12 Month	6		0	
Standard Chemical Analysis	Alkalinity	1 Ret./2 Month	5		0	
	Aluminium (Al) 0.2	1 Ret./2 Month	5		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Bicarbonate (HCO^3)	1 Ret./2 Month	5		0	
	Boron (B) **4**	1 Ret./2 Month	5		0	
	Calcium (Ca)	1 Ret./2 Month	5		0	
	Carbonate (CO^3)	1 Ret./2 Month	5		0	
	Chloride (Cl) **250**	1 Ret./Month	5	250 mg/L	0	
	Conductivity	1 Ret./Month	5		0	
	Copper (Cu) **2** **1**	1 Ret./Month	5	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./Month	5		0	
	Fluoride (F) **1.5**	1 Ret./Month	5	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./Month	5		0	
	Hydroxide (OH)	1 Ret./Month	5		0	
	Iron (Fe) **0.3**	1 Ret./Month	5		0	
	Magnesium (mg)	1 Ret./Month	5		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Manganese (Mn) **0.5** **0.1**	1 Ret./Month	5	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	
	Mole Ratio	1 Ret./Month	5		0	
	Nitrate (NO^3) **50**	1 Ret./Month	5	50 mg/L	0	
	pH **6.5-8.5**	1 Ret./Month	5	6.5 - 8.5 @ 22°	0	
	pH Sat	1 Ret./Month	5		0	
	Potassium (K)	1 Ret./Month	5		0	
	Residual Alkalinity	1 Ret./Month	5		0	
	Saturation Index	1 Ret./Month	5		0	
	Silica **80**	1 Ret./Month	5	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./Month	5	180 mg/L	5	Aesthetic Value Only
	Sodium Absorpt. Ratio	1 Ret./Month	5		0	
	Sulphate (SO^4) **500** **250**	1 Ret./Month	5	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Temporary Hardness	1 Ret./Month	5		0	
	Total Dissolved Ions	1 Ret./Month	5		0	
	Total Dissolved Solids **600**	1 Ret./Month	5	600 mg/L	5	Aesthetic Value Only
	Total Hardness **200**	1 Ret./Month	5	200 mg $CaCO_3$/L	5	Aesthetic Value Only
	True Colour **15**	1 Ret./Month	5	15 Hazen	0	
	Turbidity **1 Treated**	1 Ret./Month	5	1 NTU - Aesthetic Value	0	
	Zinc (Zn) **3**	1 WTP/Month 1 Ret./Month	5	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	1 R/3 Months	4		0	
	Bromodi-chloromethane	1 R/3 Months	4		0	
	Dibromo-chloromethane	1 R/3 Months	4		0	
	Bromoform	1 R/3 Months	4		0	
	Total Trihalomethanes (250 µg/L)	1 R/3 Months	4		0	
	Monochloro-acetic Acid (150 µg/L)	1 R/3 Months	4		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Monobromo-acetic Acid	1 R/3 Months	4		0	
	Dichloro-acetic Acid (100 µg/L)	1 R/3 Months	4		0	
	Trichloro-acetic Acid (100 µg/L)	1 R/3 Months	4		0	
	Bromochloro-acetic Acid	1 R/3 Months	4		0	
	Bromodichloro-acetic Acid	1 R/3 Months	4		0	
	Dibrom-acetic Acid	1 R/3 Months	4		0	
	Chlorodibromo-acetic Acid	1 R/3 Months	4		0	
	Dalapon 2,2-DPA (500 µg/L)	1 R/3 Months	4		0	
	Chlorite (0.8 mg/L)	1 R/3 Months	4		0	
	Chlorate (0.7mg/L)	1 R/3 Months	4		0	

4.2 Verification Monitoring: Chinchilla

Scheme: Chinchilla

Population: 5490

Connections: 3153

Table 6 – Drinking water quality performance - Verification Monitoring - Chinchilla

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Fluoride	Treated Spadns	3 WTP/Month 3 Ret./Month	78	1.5mg/L	0	
Microbiological	E. coli	1 WTP/Month 6 Ret./Month	93	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 6 Ret./Month	93		0	
Pesticides	Ametryn (70)	1 WTP/12 Month	4	70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month	4	20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month	4	400 ug/L	0	
	DEET	1 WTP/12 Month	4		0	
	Desethyl Atrazine	1 WTP/12 Month	4		0	
	Desisopropyl Atrazine	1 WTP/12 Month	4		0	
	Diuron (20)	1 WTP/12 Month	4	20 ug/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Fluometuron (70)	1 WTP/12 Month	4	70 ug/L	0	
	Hexazione Hexazinone (400)	1 WTP/12 Month	4	400 ug/L	0	
	Imidacloprid	1 WTP/12 Month	4		0	
	Metolachlor (300)	1 WTP/12 Month	4		0	
	Prometryn	1 WTP/12 Month	4		0	
	N-Butylbenzenesulfonamide	1 WTP/12 Month	4		0	
	Tebuthiuron	1 WTP/12 Month	4		0	
	Simazine (20)	1 WTP/12 Month	4	20 ug/L	0	
	Triethyl Phosphate	1 WTP/12 Month	4		0	
	Tris(Chloropropyl) Phosphate Isomers	1 WTP/12 Month	4		0	
Standard Chemical Analysis	Alkalinity	1 Ret./Month	12		0	
	Aluminium (Al) **0.2**	1 Ret./Month	12	0.2ug/L	2	Aesthetic Value Only
	Bicarbonate (HCO^{3})	1 Ret./Month	12		0	
	Boron (B) **4**	1 Ret./Month	12		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Calcium (Ca)	1 Ret./Month	12		0	
	Carbonate (CO^3)	1 Ret./Month	12		0	
	Chloride (Cl) **250**	1 Ret./Month	12	250 mg/L	0	
	Conductivity	1 Ret./Month	12		0	
	Copper (Cu) **2** **1**	1 Ret./Month	12	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./Month	12		0	
	Fluoride (F) **1.5**	1 Ret./Month	12	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./Month	12		0	
	Hydroxide (OH)	1 Ret./Month	12		0	
	Iron (Fe) **0.3**	1 Ret./Month	12		0	
	Magnesium (mg)	1 Ret./Month	12		0	
	Manganese (Mn) **0.5** **0.1**	1 Ret./Month	12	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	
	Mole Ratio	1 Ret./Month	12		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Nitrate (NO^3) **50**	1 Ret./Month	12	50 mg/L	0	
	pH **6.5-8.5**	1 Ret./Month	12	6.5 - 8.5 @ 22°	0	
	pH Sat	1 Ret./Month	12		0	
	Potassium (K)	1 Ret./Month	12		0	
	Residual Alkalinity	1 Ret./Month	12		0	
	Saturation Index	1 Ret./Month	12		0	
	Silica **80**	1 Ret./Month	12	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./Month	12	180 mg/L	0	
	Sodium Absorpt. Ratio	1 Ret./Month	12		0	
	Sulphate (SO^4) **500** **250**	1 Ret./Month	12	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	1 Ret./Month	12		0	
	Total Dissolved Ions	1 Ret./Month	12		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Total Dissolved Solids **600**	1 Ret./Month	12	600 mg/L	0	
	Total Hardness **200**	1 Ret./Month	12	200 mg $CaCO_3$/L	0	
	True Colour **15**	1 Ret./Month	12	15 Hazen	0	
	Turbidity **1 Treated**	1 Ret./Month	12	1 NTU - Aesthetic Value	0	
	Zinc (Zn) **3**	1 Ret./Month	12	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	3 R/3 Months	8		0	
	Bromodi-chloromethane	3 R/3 Months	8		0	
	Dibromo-chloromethane	3 R/3 Months	8		0	
	Bromoform	3 R/3 Months	8		0	
	Total Trihalomethanes (250 µg/L)	3 R/3 Months	8		0	
	Monochloro-acetic Acid (150 µg/L)	3 R/3 Months	8		0	
	Monobromo-acetic Acid	3 R/3 Months	8		0	
	Dichloro-acetic Acid (100 µg/L)	3 R/3 Months	8		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Trichloro-acetic Acid (100 µg/L)	3 R/3 Months	8		0	
	Bromochloro-acetic Acid	3 R/3 Months	8		0	
	Bromodichloro-acetic Acid	3 R/3 Months	8		0	
	Dibrom-acetic Acid	3 R/3 Months	8		0	
	Chlorodibromo-acetic Acid	3 R/3 Months	8		0	
	Dalapon 2,2-DPA (500 µg/L)	3 R/3 Months	8		0	
	Chlorite (0.8 mg/L)	3 R/3 Months	8		0	
	Chlorate (0.7mg/L)	3 R/3 Months	8		0	

4.3 Verification Monitoring: Condamine

Scheme: Condamine

Population: 210

Connections: 116

Table 7 – Drinking water quality performance - Verification Monitoring - Condamine

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Microbiological	E. coli	1 WTP/Month 2 Ret./Month	40	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 2 Ret./Month	40		0	
Pesticides	Ametryn (70)	1 WTP/12 Month	4	70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month	4	20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month	4	400 ug/L	0	
	DEET	1 WTP/12 Month	4		0	
	Desethyl Atrazine	1 WTP/12 Month	4		0	
	Desisopropyl Atrazine	1 WTP/12 Month	4		0	
	Diuron (20)	1 WTP/12 Month	4	20 ug/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Fluometuron (70)	1 WTP/12 Month	4	70 ug/L	0	
	Hexazione Hexazinone (400)	1 WTP/12 Month	4	400 ug/L	0	
	Imidacloprid	1 WTP/12 Month	4		0	
	Metolachlor (300)	1 WTP/12 Month	4		0	
	Prometryn	1 WTP/12 Month	4		0	
	Tebuthiuron	1 WTP/12 Month	4		0	
	Simazine (20)	1 WTP/12 Month	4	20 ug/L	0	
	Tebuthiuron	1 WTP/12 Month	4		0	
Standard Chemical Analysis	Alkalinity	1 Ret./Month	12		0	
	Aluminium (Al) **0.2**	1 Ret./Month	12		0	
	Bicarbonate (HCO^{3})	1 Ret./Month	12		0	
	Boron (B) **4**	1 Ret./Month	12		0	
	Calcium (Ca)	1 Ret./Month	12		0	
	Carbonate (CO^{3})	1 Ret./Month	12		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Chloride (Cl) **250**	1 Ret./Month	12	250 mg/L	0	
	Conductivity	1 Ret./Month	12		0	
	Copper (Cu) **2** **1**	1 Ret./Month	12	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./Month	12		0	
	Fluoride (F) **1.5**	1 Ret./Month	12	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./Month	12		0	
	Hydroxide (OH)	1 Ret./Month	12		0	
	Iron (Fe) **0.3**	1 Ret./Month	12		0	
	Magnesium (mg)	1 Ret./Month	12		0	
	Manganese (Mn) **0.5** **0.1**	1 Ret./Month	12	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	
	Mole Ratio	1 Ret./Month	12		0	
	Nitrate (NO^3) **50**	1 Ret./Month	12	50 mg/L	0	
	pH **6.5-8.5**	1 Ret./Month	12	6.5 - 8.5 @ 22°	4	Changes in pH due to lengthy transport of sample

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	pH Sat	1 Ret./Month	12		0	
	Potassium (K)	1 Ret./Month	12		0	
	Residual Alkalinity	1 Ret./Month	12		0	
	Saturation Index	1 Ret./Month	12		0	
	Silica **80**	1 Ret./Month	12	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./Month	12	180 mg/L	0	
	Sodium Absorpt. Ratio	1 Ret./Month	12		0	
	Sulphate (SO^4) **500** **250**	1 Ret./Month	12	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	1 Ret./Month	12		0	
	Total Dissolved Ions	1 Ret./Month	12		0	
	Total Dissolved Solids **600**	1 Ret./Month	12	600 mg/L	0	
	Total Hardness **200**	1 Ret./Month	12	200 mg $CaCO_3$/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	True Colour **15**	1 Ret./Month	12	15 Hazen	0	
	Turbidity **1 Treated**	1 Ret./Month	12	1 NTU - Aesthetic Value	0	
	Zinc (Zn) **3**	1 WTP/Month 1 Ret./Month	12	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	1 R/3 Months	5		0	
	Bromodi-chloromethane	1 R/3 Months	5		0	
	Dibromo-chloromethane	1 R/3 Months	5		0	
	Bromoform	1 R/3 Months	5		0	
	Total Trihalomethanes (250 µg/L)	1 R/3 Months	5		0	
	Monochloro-acetic Acid (150 µg/L)	1 R/3 Months	5		0	
	Monobromo-acetic Acid	1 R/3 Months	5		0	
	Dichloro-acetic Acid (100 µg/L)	1 R/3 Months	5		0	
	Trichloro-acetic Acid (100 µg/L)	1 R/3 Months	5		0	
	Bromochloro-acetic Acid	1 R/3 Months	5		0	
	Bromodichloro-acetic Acid	1 R/3 Months	5		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Dibrom-acetic Acid	1 R/3 Months	5		0	
	Chlorodibromo-acetic Acid	1 R/3 Months	5		0	
	Dalapon 2,2-DPA (500 µg/L)	1 R/3 Months	5		0	
	Chlorite (0.8 mg/L)	1 R/3 Months	5		0	
	Chlorate (0.7mg/L)	1 R/3 Months	5		0	

4.4 Verification Monitoring: Dalby

Scheme: Dalby

Population: 11020

Connections: 5289

Table 8 – Drinking water quality performance - Verification Monitoring - Dalby

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Fluoride	Treated Spadns	3 WTP/Month 3 Ret./Month	72	1.5mg/L	0	
Microbiological	E. coli	1 WTP/Month 7 Ret./Month	96	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 6 Ret./Month	96		0	
Pesticides	Ametryn (70)	1 WTP/12 Month	6	70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month	6	20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month	6	400 ug/L	0	
	Deet	1 WTP/12 Month	6		0	
	Desethyl Atrazine	1 WTP/12 Month	6		0	
	Desisopropyl Atrazine	1 WTP/12 Month	6		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Diuron (20)	1 WTP/12 Month	6	20 ug/L	0	
	Fluometuron (70)	1 WTP/12 Month	6	70 ug/L	0	
	Hexazione Hexazinone (400)	1 WTP/12 Month	6	400 ug/L	0	
	Imidacloprid	1 WTP/12 Month	6		0	
	Metolachlor (300)	1 WTP/12 Month	6		0	
	N-Butylbenzenesulfonamide	1 WTP/12 Month	6		0	
	Prometryn	1 WTP/12 Month	6		0	
	Tebuthiuron	1 WTP/12 Month	6		0	
	Simazine (20)	1 WTP/12 Month	6	20 ug/L	0	
	Terbuthylzaine	1 WTP/12 Month	6		0	
	Triethyl Phosphate	1 WTP/12 Month	6		0	
	Tris(Chloropropyl) Phosphate Isomers	1 WTP/12 Month	6		0	
Standard Chemical Analysis	Alkalinity	4 Ret./Month	47		0	
	Aluminium (Al) **0.2**	4 Ret./Month	47		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Bicarbonate (HCO^3)	4 Ret./Month	47		0	
	Boron (B) 4	4 Ret./Month	47		0	
	Calcium (Ca)	4 Ret./Month	47		0	
	Carbonate (CO^3)	4 Ret./Month	47		0	
	Chloride (Cl) 250	4 Ret./Month	47	250 mg/L	0	
	Conductivity	4 Ret./Month	47		0	
	Copper (Cu) 2 1	4 Ret./Month	47	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	4 Ret./Month	47		0	
	Fluoride (F) 1.5	4 Ret./Month	47	1.5 mg/L	0	
	Hydrogen (H)	4 Ret./Month	47		0	
	Hydroxide (OH)	4 Ret./Month	47		0	
	Iron (Fe) 0.3	4 Ret./Month	47		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Magnesium (mg)	4 Ret./Month	47		0	
	Manganese (Mn) **0.5** **0.1**	4 Ret./Month	47	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	
	Mole Ratio	4 Ret./Month	47		0	
	Nitrate (NO^3) **50**	4 Ret./Month	47	50 mg/L	0	
	pH **6.5-8.5**	4 Ret./Month	47	6.5 - 8.5 @ 22°	0	
	pH Sat	4 Ret./Month	47		0	
	Potassium (K)	4 Ret./Month	47		0	
	Residual Alkalinity	4 Ret./Month	47		0	
	Saturation Index	4 Ret./Month	47		0	
	Silica **80**	4 Ret./Month	47	80 mg/L	0	
	Sodium (Na) **180**	4 Ret./Month	47	180 mg/L	0	
	Sodium Absorpt. Ratio	4 Ret./Month	47		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Sulphate (SO^4) 500 250	4 Ret./Month	47	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	4 Ret./Month	47		0	
	Total Dissolved Ions	4 Ret./Month	47		0	
	Total Dissolved Solids 600	4 Ret./Month	47	600 mg/L	0	
	Total Hardness 200	4 Ret./Month	47	200 mg $CaCO_3$/L	0	
	True Colour 15	4 Ret./Month	47	15 Hazen	0	
	Turbidity 1 Treated	4 Ret./Month	47	1 NTU - Aesthetic Value	0	
	Zinc (Zn) 3	4 Ret./Month	47	3 mg/L - Aesthetic Value	0	
	Saturation Index	4 Ret./Month	47		0	
	Silica 80	4 Ret./Month	47	80 mg/L	0	
	Sodium (Na) 180	4 Ret./Month	47	180 mg/L	0	
	Sodium Absorpt. Ratio	4 Ret./Month	47		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Sulphate (SO^4) 500 250	4 Ret./Month	47	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	4 Ret./Month	47		0	
	Total Dissolved Ions	4 Ret./Month	47		0	
	Total Dissolved Solids 600	4 Ret./Month	47	600 mg/L	0	
	Total Hardness 200	4 Ret./Month	47	200 mg $CaCO_3$/L	0	
	True Colour 15	4 Ret./Month	47	15 Hazen	0	
	Turbidity 1 Treated	4 Ret./Month	47	1 NTU - Aesthetic Value	0	
	Zinc (Zn) 3	4 Ret./Month	47	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	3 R/3 Months	9		0	
	Bromodi-chloromethane	3 R/3 Months	9		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Dibromo-chloromethane	3 R/3 Months	9		0	
	Bromoform	3 R/3 Months	9		0	
	Total Trihalomethanes (250 µg/L)	3 R/3 Months	9		0	
	Monochloro-acetic Acid (150 µg/L)	3 R/3 Months	9		0	
	Monobromo-acetic Acid	3 R/3 Months	9		0	
	Dichloro-acetic Acid (100 µg/L)	3 R/3 Months	9		0	
	Trichloro-acetic Acid (100 µg/L)	3 R/3 Months	9		0	
	Bromochloro-acetic Acid	3 R/3 Months	9		0	
	Bromodichloro-acetic Acid	3 R/3 Months	9		0	
	Dibrom-acetic Acid	3 R/3 Months	9		0	
	Chlorodibromo-acetic Acid	3 R/3 Months	9		0	
	Dalapon 2,2-DPA (500 µg/L)	3 R/3 Months	9		0	
	Chlorite (0.8 mg/L)	3 R/3 Months	9		0	
	Chlorate (0.7mg/L)	3 R/3 Months	9		0	

4.5 Verification Monitoring: Jandowae

Scheme: Jandowae

Population: 1100

Connections: 482

Table 9 – Drinking water quality performance - Verification Monitoring - Jandowae

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
DBP's	Chloroform	1 R/3 Months	12		0	
	Bromodi-chloromethane	1 R/3 Months	12		0	
	Dibromo-chloromethane	1 R/3 Months	12		0	
	Bromoform	1 R/3 Months	12		0	
	Total Trihalomethanes (250 µg/L)	1 R/3 Months	12	250ug/L	2	DWI-7-480-00090: Reported to QWSR, resample requested and conducted
	Monochloro-acetic Acid (150 µg/L)	1 R/3 Months	12		0	
	Monobromo-acetic Acid	1 R/3 Months	12		0	
	Dichloro-acetic Acid (100 µg/L)	1 R/3 Months	12	100ug/L	2	DWI-7-480-00090: Reported to QWSR, resample requested and conducted

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Trichloro-acetic Acid (100 µg/L)	1 R/3 Months	12	100ug/L	2	DWI-7-480-00090: Reported to QWSR, resample requested and conducted
	Bromochloro-acetic Acid	1 R/3 Months	12		0	
	Bromodichloro-acetic Acid	1 R/3 Months	12		0	
	Dibrom-acetic Acid	1 R/3 Months	12		0	
	Chlorodibromo-acetic Acid	1 R/3 Months	12		0	
	Dalapon 2,2-DPA (500 µg/L)	1 R/3 Months	12		0	
	Chlorite (0.8 mg/L)	1 R/3 Months	12		0	
	Chlorate (0.7mg/L)	1 R/3 Months	12		0	
Microbiological	E. coli	1 WTP/Month 5 Ret./Month	72	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 5 Ret./Month	72		0	
Pesticides	Ametryn (70)	1 WTP/12 Month	8	70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month	8	20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month	8	400 ug/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	DEET	1 WTP/12 Month	8		0	
	Desethyl Atrazine	1 WTP/12 Month	8		0	
	Desisopropyl Atrazine	1 WTP/12 Month	8		0	
	Diuron (20)	1 WTP/12 Month	8	20 ug/L	0	
	Fluometuron (70)	1 WTP/12 Month	8	70 ug/L	0	
	Hexazione Hexazinone (400)	1 WTP/12 Month	8	400 ug/L	0	
	Imidacloprid	1 WTP/12 Month	8		0	
	Metolachlor (300)	1 WTP/12 Month	8		0	
	Prometryn	1 WTP/12 Month	8		0	
	N-Butylbenzenesulfonamide	1 WTP/12 Month	8		0	
	Tebuthiuron	1 WTP/12 Month	8		0	
	Simazine (20)	1 WTP/12 Month	8	20 ug/L	0	
	Triethyl Phosphate	1 WTP/12 Month	8		0	
	Tris(Chloropropyl) Phosphate Isomers	1 WTP/12 Month	8		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Standard Chemical Analysis	Alkalinity	1 Ret./Month	11		0	
	Aluminium (Al) **0.2**	1 Ret./Month	11		0	0
	Bicarbonate (HCO^3)	1 Ret./Month	11		0	
	Boron (B) **4**	1 Ret./Month	11		0	
	Calcium (Ca)	1 Ret./Month	11		0	
	Carbonate (CO^3)	1 Ret./Month	11		0	
	Chloride (Cl) **250**	1 Ret./Month	11	250 mg/L	0	
	Conductivity	1 Ret./Month	11		0	
	Copper (Cu) **2** **1**	1 Ret./Month	11	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./Month	11		0	
	Fluoride (F) **1.5**	1 Ret./Month	11	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./Month	11		0	
	Hydroxide (OH)	1 Ret./Month	11		0	
	Iron (Fe) **0.3**	1 Ret./Month	11		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Magnesium (mg)	1 Ret./Month	11		0	
	Manganese (Mn) **0.5** **0.1**	1 Ret./Month	11	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	
	Mole Ratio	1 Ret./Month	11		0	
	Nitrate (NO^3) **50**	1 Ret./Month	11	50 mg/L	0	
	pH **6.5-8.5**	1 Ret./Month	11	6.5 - 8.5 @ 22^o	0	
	pH Sat	1 Ret./Month	11		0	
	Potassium (K)	1 Ret./Month	11		0	
	Residual Alkalinity	1 Ret./Month	11		0	
	Saturation Index	1 Ret./Month	11		0	
	Silica **80**	1 Ret./Month	11	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./Month	11	180 mg/L	0	
	Sodium Absorpt. Ratio	1 Ret./Month	11		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Sulphate (SO^4) 500 250	1 Ret./Month	11	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	1 Ret./Month	11		0	
	Total Dissolved Ions	1 Ret./Month	11		0	
	Total Dissolved Solids 600	1 Ret./Month	11	600 mg/L	0	
	Total Hardness 200	1 Ret./Month	11	200 mg $CaCO_3$/L	0	
	True Colour 15	1 Ret./Month	11	15 Hazen	0	
	Turbidity 1 Treated	1 Ret./Month	11	1 NTU - Aesthetic Value	0	
	Zinc (Zn) 3	1 WTP/Month 1 Ret./Month	11	3 mg/L - Aesthetic Value	0	

4.6 Verification Monitoring: Miles

Scheme: Miles

Population: 1460

Connections: 896

Table 10 – Drinking water quality performance - Verification Monitoring - Miles

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Fluoride	Treated Spadns	3 WTP/Month 3 Ret./Month	69	1.5mg/L	0	
Microbiological	E. coli	1 WTP/Month 5 Ret./Month	76	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 5 Ret./Month	76		0	
Pesticides	Ametryn (70)	1 WTP/12 Month	7	70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month	7	20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month	7	400 ug/L	0	
	DEET	1 WTP/12 Month	7		0	
	Desethyl Atrazine	1 WTP/12 Month	7		0	
	Desisopropyl Atrazine	1 WTP/12 Month	7		0	
	Diuron (20)	1 WTP/12 Month	7	20 ug/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Fluometuron (70)	1 WTP/12 Month	7	70 ug/L	0	
	Hexazione Hexazinone (400)	1 WTP/12 Month	7	400 ug/L	0	
	Imidacloprid	1 WTP/12 Month	7		0	
	Metolachlor (300)	1 WTP/12 Month	7		0	
	Prometryn	1 WTP/12 Month	7		0	
	Tebuthiuron	1 WTP/12 Month	7		0	
	Terbutryn	1 WTP/12 Month	7		0	
	Simazine (20)	1 WTP/12 Month	7	20 ug/L	0	
	Tris(Chloropropyl) Phosphate Isomers	1 WTP/12 Month	7		0	
Standard Chemical Analysis	Alkalinity	1 Ret./Month	12		0	
	Aluminium (Al) **0.2**	1 Ret./Month	12		0	
	Bicarbonate (HCO^{3})	1 Ret./Month	12		0	
	Boron (B) **4**	1 Ret./Month	12		0	
	Calcium (Ca)	1 Ret./Month	12		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Carbonate (CO^3)	1 Ret./Month	12		0	
	Chloride (Cl) **250**	1 Ret./Month	12	250 mg/L	0	
	Conductivity	1 Ret./Month	12		0	
	Copper (Cu) **2** **1**	1 Ret./Month	12	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./Month	12		0	
	Fluoride (F) **1.5**	1 Ret./Month	12	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./Month	12		0	
	Hydroxide (OH)	1 Ret./Month	12		0	
	Iron (Fe) **0.3**	1 Ret./Month	12		0	
	Magnesium (mg)	1 Ret./Month	12		0	
	Manganese (Mn) **0.5** **0.1**	1 Ret./Month	12	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	
	Mole Ratio	1 Ret./Month	12		0	
	Nitrate (NO^3) **50**	1 Ret./Month	12	50 mg/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	pH **6.5-8.5**	1 Ret./Month	12	6.5 - 8.5 @ 22°	0	
	pH Sat	1 Ret./Month	12		0	
	Potassium (K)	1 Ret./Month	12		0	
	Residual Alkalinity	1 Ret./Month	12		0	
	Saturation Index	1 Ret./Month	12		0	
	Silica **80**	1 Ret./Month	12	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./Month	12	180 mg/L	0	
	Sodium Absorpt. Ratio	1 Ret./Month	12		0	
	Sulphate (SO^{4}) **500** **250**	1 Ret./Month	12	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	1 Ret./Month	12		0	
	Total Dissolved Ions	1 Ret./Month	12		0	
	Total Dissolved Solids **600**	1 Ret./Month	12	600 mg/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Total Hardness **200**	1 Ret./Month	12	200 mg $CaCO_3$/L	0	
	True Colour **15**	1 Ret./Month	12	15 Hazen	0	
	Turbidity **1 Treated**	1 Ret./Month	12	1 NTU - Aesthetic Value	0	
	Zinc (Zn) **3**	1 WTP/Month 1 Ret./Month	12	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	1 R/3 Months	9		0	
	Bromodi-chloromethane	1 R/3 Months	9		0	
	Dibromo-chloromethane	1 R/3 Months	9		0	
	Bromoform	1 R/3 Months	9		0	
	Total Trihalomethanes (250 µg/L)	1 R/3 Months	9		0	DWI-7-480-00086
	Monochloro-acetic Acid (150 µg/L)	1 R/3 Months	9		0	
	Monobromo-acetic Acid	1 R/3 Months	9		0	
	Dichloro-acetic Acid (100 µg/L)	1 R/3 Months	9		0	DWI-7-480-00087
	Trichloro-acetic Acid (100 µg/L)	1 R/3 Months	9		0	
	Bromochloro-acetic Acid	1 R/3 Months	9		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Bromodichloro-acetic Acid	1 R/3 Months	9		0	
	Dibrom-acetic Acid	1 R/3 Months	9		0	
	Chlorodibromo-acetic Acid	1 R/3 Months	9		0	
	Dalapon 2,2-DPA (500 µg/L)	1 R/3 Months	9		0	
	Chlorite (0.8 mg/L)	1 R/3 Months	9		0	
	Chlorate (0.7mg/L)	1 R/3 Months	9		0	DWI-7-480-00081

4.7 Verification Monitoring: Tara

Scheme: Tara

Population: 1150

Connections: 469

Table 11 – Drinking water quality performance - Verification Monitoring - Tara

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Microbiological	E. coli	1 WTP/Month 5 Ret./Month	33	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 5 Ret./Month	33		0	
Pesticides	Ametryn (70)	1 WTP/12 Month		70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month		20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month		400 ug/L	0	
	DEET	1 WTP/12 Month			0	
	Desethyl Atrazine	1 WTP/12 Month			0	
	Desisopropyl Atrazine	1 WTP/12 Month			0	
	Diuron (20)	1 WTP/12 Month		20 ug/L	0	
	Fluometuron (70)	1 WTP/12 Month		70 ug/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Hexazione Hexazinone (400)	1 WTP/12 Month		400 ug/L	0	
	Imidacloprid	1 WTP/12 Month			0	
	Metolachlor (300)	1 WTP/12 Month			0	
	Prometryn	1 WTP/12 Month			0	
	N-Butylbenzenesulfonamide	1 WTP/12 Month			0	
	Tebuthiuron	1 WTP/12 Month			0	
	Simazine (20)	1 WTP/12 Month		20 ug/L	0	
	Triethyl Phosphate	1 WTP/12 Month			0	
	Tris(Chloropropyl) Phosphate Isomers	1 WTP/12 Month			0	
Standard Chemical Analysis	Alkalinity	1 Ret./Month	15		0	
	Aluminium (Al) **0.2**	1 Ret./Month	15		0	0
	Bicarbonate (HCO^{3})	1 Ret./Month	15		0	
	Boron (B) **4**	1 Ret./Month	15		0	
	Calcium (Ca)	1 Ret./Month	15		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Carbonate (CO^3)	1 Ret./Month	15		0	
	Chloride (Cl) **250**	1 Ret./Month	15	250 mg/L	0	
	Conductivity	1 Ret./Month	15		0	
	Copper (Cu) **2** **1**	1 Ret./Month	15	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./Month	15		0	
	Fluoride (F) **1.5**	1 Ret./Month	15	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./Month	15		0	
	Hydroxide (OH)	1 Ret./Month	15		0	
	Iron (Fe) **0.3**	1 Ret./Month	15		0	
	Magnesium (mg)	1 Ret./Month	15		0	
	Manganese (Mn) **0.5** **0.1**	1 Ret./Month	15	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Mole Ratio	1 Ret./Month	15		0	
	Nitrate (NO^3) **50**	1 Ret./Month	15	50 mg/L	0	
	pH **6.5-8.5**	1 Ret./Month	15	6.5 - 8.5 @ 22°	1	Changes in pH due to lengthy transport of sample
	pH Sat	1 Ret./Month	15		0	
	Potassium (K)	1 Ret./Month	15		0	
	Residual Alkalinity	1 Ret./Month	15		0	
	Saturation Index	1 Ret./Month	15		0	
	Silica **80**	1 Ret./Month	15	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./Month	15	180 mg/L	0	
	Sodium Absorpt. Ratio	1 Ret./Month	15		0	
	Sulphate (SO^4) **500** **250**	1 Ret./Month	15	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	1 Ret./Month	15		0	
	Total Dissolved Ions	1 Ret./Month	15		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Total Dissolved Solids **600**	1 Ret./Month	15	600 mg/L	0	
	Total Hardness **200**	1 Ret./Month	15	200 mg $CaCO_3$/L	0	
	True Colour **15**	1 Ret./Month	15	15 Hazen	0	
	Turbidity **1 Treated**	1 Ret./Month	15	1 NTU - Aesthetic Value	0	
	Zinc (Zn) **3**	1 WTP/Month 1 Ret./Month	15	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	1 R/3 Months	8		0	
	Bromodi-chloromethane	1 R/3 Months	8		0	
	Dibromo-chloromethane	1 R/3 Months	8		0	
	Bromoform	1 R/3 Months	8		0	
	Total Trihalomethanes (250 µg/L)	1 R/3 Months	8		0	
	Monochloro-acetic Acid (150 µg/L)	1 R/3 Months	8		0	
	Monobromo-acetic Acid	1 R/3 Months	8		0	
	Dichloro-acetic Acid (100 µg/L)	1 R/3 Months	8		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Trichloro-acetic Acid (100 µg/L)	1 R/3 Months	8		0	
	Bromochloro-acetic Acid	1 R/3 Months	8		3	
	Bromodichloro-acetic Acid	1 R/3 Months	8		2	
	Dibrom-acetic Acid	1 R/3 Months	8		3	
	Chlorodibromo-acetic Acid	1 R/3 Months	8		2	
	Dalapon 2,2-DPA (500 µg/L)	1 R/3 Months	8		0	
	Chlorite (0.8 mg/L)	1 R/3 Months	8		0	
	Chlorate (0.7mg/L)	1 R/3 Months	8		0	

4.8 Verification Monitoring: Wandoan

Scheme: Wandoan

Population: 500

Connections: 384

Table 12 – Drinking water quality performance - Verification Monitoring - Wandoan

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Microbiological	E. coli	1 WTP/Month 1 Ret./Month	27	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 1 Ret./Month	27		0	
Standard Chemical Analysis	Alkalinity	1 Ret./Month	12		0	
	Aluminium (Al) **0.2**	1 Ret./Month	12		0	
	Bicarbonate (HCO^3)	1 Ret./Month	12		0	
	Boron (B) **4**	1 Ret./Month	12		0	
	Calcium (Ca)	1 Ret./Month	12		0	
	Carbonate (CO^3)	1 Ret./Month	12		0	
	Chloride (Cl) **250**	1 Ret./Month	12	250 mg/L	0	
	Conductivity	1 Ret./Month	12		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Copper (Cu) **2** **1**	1 Ret./Month	12	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./Month	12		0	
	Fluoride (F) **1.5**	1 Ret./Month	12	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./Month	12		0	
	Hydroxide (OH)	1 Ret./Month	12		0	
	Iron (Fe) **0.3**	1 Ret./Month	12		0	
	Magnesium (mg)	1 Ret./Month	12		0	
	Manganese (Mn) **0.5** **0.1**	1 Ret./Month	12	0.1 mg/L - Aesthetic Value 0.5 mg/L - Health Value	0	
	Mole Ratio	1 Ret./Month	12		0	
	Nitrate (NO^3) **50**	1 Ret./Month	12	50 mg/L	0	
	pH **6.5-8.5**	1 Ret./Month	12	6.5 - 8.5 @ 22°	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	pH Sat	1 Ret./Month	12		0	
	Potassium (K)	1 Ret./Month	12		0	
	Residual Alkalinity	1 Ret./Month	12		0	
	Saturation Index	1 Ret./Month	12		0	
	Silica **80**	1 Ret./Month	12	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./Month	12	180 mg/L	0	
	Sodium Absorpt. Ratio	1 Ret./Month	12		0	
	Sulphate (SO^4) **500** **250**	1 Ret./Month	12	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	1 Ret./Month	12		0	
	Total Dissolved Ions	1 Ret./Month	12		0	
	Total Dissolved Solids **600**	1 Ret./Month	12	600 mg/L	0	
	Total Hardness **200**	1 Ret./Month	12	200 mg $CaCO_3$/L	0	
	True Colour **15**	1 Ret./Month	12	15 Hazen	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Turbidity **1 Treated**	1 Ret./Month	12	1 NTU - Aesthetic Value	0	
	Zinc (Zn) **3**	1 WTP/Month 1 Ret./Month	12	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	1 R/3 Months	8		0	
	Bromodi-chloromethane	1 R/3 Months	8		0	
	Dibromo-chloromethane	1 R/3 Months	8		0	
	Bromoform	1 R/3 Months	8		0	
	Total Trihalomethanes (250 µg/L)	1 R/3 Months	8		0	
	Monochloro-acetic Acid (150 µg/L)	1 R/3 Months	8		0	
	Monobromo-acetic Acid	1 R/3 Months	8		0	
	Dichloro-acetic Acid (100 µg/L)	1 R/3 Months	8		0	
	Trichloro-acetic Acid (100 µg/L)	1 R/3 Months	8		0	
	Bromochloro-acetic Acid	1 R/3 Months	8		0	
	Bromodichloro-acetic Acid	1 R/3 Months	8		0	
	Dibrom-acetic Acid	1 R/3 Months	8		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Chlorodibromo-acetic Acid	1 R/3 Months	8		0	
	Dalapon 2,2-DPA (500 µg/L)	1 R/3 Months	8		0	
	Chlorite (0.8 mg/L)	1 R/3 Months	8		0	
	Chlorate (0.7mg/L)	1 R/3 Months	8		0	

4.9 Verification Monitoring: Warra

Scheme: Warra

Population: 150

Connections: 73

Table 13 – Drinking water quality performance - Verification Monitoring - Warra

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
Microbiological	E. coli	1 WTP/Month 1 Ret./Month	24	0 mpn/100ml	0	
	Total Coliforms	1 WTP/Month 1 Ret./Month	24		0	
Pesticides	Ametryn (70)	1 WTP/12 Month	3	70 ug/L	0	
	Atrazine (20)	1 WTP/12 Month	3	20 ug/L	0	
	Bromacil (400)	1 WTP/12 Month	3	400 ug/L	0	
	DEET	1 WTP/12 Month	3		0	
	Desethyl Atrazine	1 WTP/12 Month	3		0	
	Desisopropyl Atrazine	1 WTP/12 Month	3		0	
	Diuron (20)	1 WTP/12 Month	3	20 ug/L	0	
	Fluometuron (70)	1 WTP/12 Month	3	70 ug/L	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Hexazione Hexazinone (400)	1 WTP/12 Month	3	400 ug/L	0	
	Imidacloprid	1 WTP/12 Month	3		0	
	Metolachlor (300)	1 WTP/12 Month	3		0	
	Prometryn	1 WTP/12 Month	3		0	
	N-Butylbenzenesulfonamide	1 WTP/12 Month	3		0	
	Tebuthiuron	1 WTP/12 Month	3		0	
	Simazine (20)	1 WTP/12 Month	3	20 ug/L	0	
	Terbutryn	1 WTP/12 Month	3		0	
	Triethyl Phosphate	1 WTP/12 Month	3		0	
	Tris(Chloropropyl) Phosphate Isomers	1 WTP/12 Month	3		0	
Standard Chemical Analysis	Alkalinity	1 Ret./2 Month	5		0	
	Aluminium (Al) **0.2**	1 Ret./2 Month	5		0	
	Bicarbonate (HCO^{3})	1 Ret./2 Month	5		0	
	Boron (B) **4**	1 Ret./2 Month	5		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Calcium (Ca)	1 Ret./2 Month	5		0	
	Carbonate (CO^3)	1 Ret./2 Month	5		0	
	Chloride (Cl) **250**	1 Ret./2 Month	5	250 mg/L	0	
	Conductivity	1 Ret./2 Month	5		0	
	Copper (Cu) **2** **1**	1 Ret./2 Month	5	1 mg/L - Aesthetic Value 2 mg/L - Health Value	0	
	Figure of Merit Ratio	1 Ret./2 Month	5		0	
	Fluoride (F) **1.5**	1 Ret./2 Month	5	1.5 mg/L	0	
	Hydrogen (H)	1 Ret./2 Month	5		0	
	Hydroxide (OH)	1 Ret./2 Month	5		0	
	Iron (Fe) **0.3**	1 Ret./2 Month	5		0	
	Magnesium (mg)	1 Ret./2 Month	5		0	
	Manganese (Mn) **0.5** **0.1**	1 Ret./2 Month	5	0.1 mg/L - Aesthetic Value	0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
				0.5 mg/L - Health Value		
	Mole Ratio	1 Ret./2 Month	5		0	
	Nitrate (NO^3) **50**	1 Ret./2 Month	5	50 mg/L	0	
	pH **6.5-8.5**	1 Ret./2 Month	5	6.5 - 8.5 @ 22°	0	
	pH Sat	1 Ret./2 Month	5		0	
	Potassium (K)	1 Ret./2 Month	5		0	
	Residual Alkalinity	1 Ret./2 Month	5		0	
	Saturation Index	1 Ret./2 Month	5		0	
	Silica **80**	1 Ret./2 Month	5	80 mg/L	0	
	Sodium (Na) **180**	1 Ret./2 Month	5	180 mg/L	0	
	Sodium Absorpt. Ratio	1 Ret./2 Month	5		0	
	Sulphate (SO^4) **500** **250**	1 Ret./2 Month	5	250 mg/L - Aesthetic Value 500 mg/L - Health Value	0	
	Temporary Hardness	1 Ret./2 Month	5		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Total Dissolved Ions	1 Ret./2 Month	5		0	
	Total Dissolved Solids **600**	1 Ret./2 Month	5	600 mg/L	5	Aesthetic value only
	Total Hardness **200**	1 Ret./2 Month	5	200 mg $CaCO_3$/L	5	Aesthetic value only
	True Colour **15**	1 Ret./2 Month	5	15 Hazen	0	
	Turbidity **1 Treated**	1 Ret./2 Month	5	1 NTU - Aesthetic Value	0	
	Zinc (Zn) **3**	1 Ret./2 Month	5	3 mg/L - Aesthetic Value	0	
DBP's	Chloroform	1 R/3 Months	4		0	
	Bromodi-chloromethane	1 R/3 Months	4		0	
	Dibromo-chloromethane	1 R/3 Months	4		0	
	Bromoform	1 R/3 Months	4		0	
	Total Trihalomethanes (250 µg/L)	1 R/3 Months	4		4	DWI-7-480-00072
	Monochloro-acetic Acid (150 µg/L)	1 R/3 Months	4		0	
	Monobromo-acetic Acid	1 R/3 Months	4		0	

Parameter	Parameter	No. of Samples Required to be Collected (*as per the DWQMP*)	No. of Samples Actually Collected and Tested	Water Quality Criteria *(ADWG guideline value)*	No. Non-Compliant Samples	Comments
	Dichloro-acetic Acid (100 µg/L)	1 R/3 Months	4		0	
	Trichloro-acetic Acid (100 µg/L)	1 R/3 Months	4		0	
	Bromochloro-acetic Acid	1 R/3 Months	4		0	
	Bromodichloro-acetic Acid	1 R/3 Months	4		0	
	Dibrom-acetic Acid	1 R/3 Months	4		0	
	Chlorodibromo-acetic Acid	1 R/3 Months	4		0	
	Dalapon 2,2-DPA (500 µg/L)	1 R/3 Months	4		0	
	Chlorite (0.8 mg/L)	1 R/3 Months	4		0	
	Chlorate (0.7mg/L)	1 R/3 Months	4		0	

Table 14. E. coli compliance with annual value

CALCULATE PERCENTAGE USING A TWELVE (12) MONTH 'ROLLING' ANNUAL VALUE

The *Public Health Regulation 2005* (the regulation) require that 98 per cent of samples taken in a 12-month period should contain no E. Coli. This requirements is referred to as the 'annual value' in Schedule 3A of the regulation.

This requirement comes into effect once you have 12 months data and should be assessed every month based on the previous 12 months data (so that it is a 'rolling' assessment).

Drinking water scheme:	Bell Verification Monitoring Results (2019/2020)											
Year	*2019/2020*											
Month	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	7	9	32	30	8	7	12	19	10	14	10	13
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	353	323	300	299	291	270	277	271	261	239	219	193
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.7%	99.7%	99.7%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.5%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Chinchilla Verification Monitoring Results (2019/2020)

Year	*2019/2020*											
Month	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	9	9	11	10	9	9	17	16	19	8	8	10
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	1
No. of samples collected in previous 12-month period	209	199	193	188	177	169	160	159	157	161	151	141
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.5%	99.5%	99.5%	99.5%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	99.3%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme:	Condamine Verification Monitoring Results 2019/20											
Year	*2019/2020*											
Month	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	16	13	14	14	14	11	13	14	14	20	2	8
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	353	332	313	294	270	255	266	261	246	228	214	180
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.7%	99.7%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.5%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme:

Dalby Verification Monitoring Results (2019/2020)

Year	*2019/2020*											
Month	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
No. of samples collected	32	27	27	32	22	25	27	28	33	34	7	7
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	265	239	278	285	292	294	298	301	309	322	331	315
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.6%	99.6%	99.6%	99.6%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Jandowae Verification Monitoring Results (2019/2020)

Year	2019/2020											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	29	24	27	36	49	32	30	31	24	10	5	5
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	211	225	240	253	271	305	321	333	345	340	329	317
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

Drinking water scheme: Miles Verification Monitoring Results (2019/2020)

Year	2019/2020											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	19	15	17	17	17	14	16	17	17	26	5	5
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	353	335	318	302	281	269	283	281	269	254	246	215
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.7%	99.7%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	99.6%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme:	Tara Verification Monitoring Results (2019/2020)											
Year	2019/2020											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	14	8	8	14	8	12	34	12	10	17	10	2
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	184	176	164	165	173	171	166	190	179	163	159	169
No. of failures for previous 12-month period	0	0	0	0	0	0	0	1	1	1	1	1
% of samples that comply	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.5%	99.4%	99.4%	99.4%	99.4%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Wandoan Verification Monitoring Results (2019/2020)

Year	2019/2020											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	5	6	8	14	11	10	12	14	4	12	16	5
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12-month period	353	321	295	270	246	228	238	232	217	189	167	147
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.7%	99.7%	99.7%	99.6%	99.6%	99.6%	99.6%	99.6%	99.5%	99.5%	99.4%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Drinking water scheme: Warra Verification Monitoring Results (2019/2020

Year	2019/2020											
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	14	10	14	17	28	12	12	16	14	12	9	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	149	148	144	146	148	164	173	175	176	177	179	171
No. of failures for previous 12-month period	1	1	1	1	1	1	1	1	1	1	1	0
% of samples that comply	99.3%	99.3%	99.3%	99.3%	99.3%	99.4%	99.4%	99.4%	99.4%	99.4%	99.4%	100.0%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

5 Incidents reported to the regulator

The incidents reported to the regulator and management actions undertaken over the 2019/20 financial year are provided in this section.

Table 15– Incidents reported to the regulator

Report No.	Town	Incident Date	Incident	Open/Closed	Actions Taken Date Closed* if applicable	Corrective Actions taken
DWI-480-19-07965	Tara	1/08/2019	Chlorine exceedance	CLOSED	Initial Notification Emailed. Dosing rate recalculated; chlorine dose rate error discovered; dose rate rechecked after re-adjustment.	09/08/19-28/08/2019 network samples taken, results within appropriate range.
DWI-7-480-20-08300	Tara	21/01/2020	E Coli	CLOSED	Initial Notification Emailed. Sampling Error assumed based on consistency of samples and chlorine residual in network. Resampled several locations. Reviewed data. Discussed with staff.	23/01/2020, further re-sampling planned for 23/01/20, 24/01/20, 25/01/20. this confirmed no systematic failure. All other test results satisfactory and the Chlorine at the time of sampling was 0.4mg/l. Subsequent re-testing confirmed sampling error.
DWI-480-20-08452	Chinchilla	16/06/2020	E Coli	CLOSED	Initial Notification Emailed. The off-site and in-house results were reviewed and compared. The "Industrial Park" site was visited & checked New samples were taken, and Staff involved were interviewed. Local reservoir was inspected.	The main was flushed until chlorine residual improved. The hypo dose pump was tested & a dose rate increased. Level of chlorine testing & attendance at pump-station was increased. Reservoir inspected. Re-sampled at Industrial Park & at other sample points for 4 days. All tests where clean and free chlorine was good.

6 Customer complaints

WDRC received relating to water quality during 2019/20

Table 16 –Customer complaints about water quality

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

7 DWQMP review outcomes

A review of the DWQMP was required due to regulation in June 2020. The components of the plan that were reviewed are below. At the time of this Annual Report, the Reviewed DWQMP sat with the Water Regulator for further review.

- 3.0 Overview Plan Overview
- 5.0 Verification Monitoring Plan
- 6.0 Sample Point Location
- 7.0 Network Water Quality Management
- 19.0 Cyber Security Plan
- 23.0 Tara Scheme Assessment

8 DWQMP audit findings

No audit was conducted or required during the reporting period 01/07/2019 - 30/06/2020