

Warrumbungle Shire Council Improvement Plan

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements
1	All	Document	Protocol	Gain formal endorsement and support of the policy from senior executive, including ensuring that organisation activities support effective water quality management such as providing appropriate staffing, financial and training resources and reporting performance to the board or chief executive.	1.1	Drinking Water Quality Policy			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Complete	Submitted report to DTS for discussion at MANEX on 1/04/2016, again on 18/05/2016 and again on 22/08/16.	Report to Council - need updating - to adopt DWMS; living document (constantly being updated); going to be in Public Health Act Oct 2018 (Ingo sent email)		Policy has been developed and was endorsed March 2019		
2	All	Training		Develop and implement a staff awareness program for the DWMS and make the DWMS visible to all employees.	1.1	Drinking Water Quality Policy			Mar-2015	High	Manager Warrumbungle Water; Technical Officer	01-Mar-15				Complete	Hardcopies distributed to DTS; Manager WW – Operational; Manager WW – Special Projects; Technical Officer; Supervisors South (Coolah/Dunedoo), Treatment Plants North (Coonabarabran, Bugaldie, Kenebri), Mains North (Coonabarabran), Baradine, Binnaway, Mendooran . For future review versions: Manager WW – Special Projects to inform Technical Officer who is to distribute copies and keep record of this(under comments					
3	Mendooran	Document	Protocol	That WSC prepare and formally adopts a "Drinking Water Quality Policy" and this policy is then "highly visible, continually communicated, understood and implemented by employees and contractors of the organisation".	1.1	Drinking Water Quality Policy	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water; Project	27-Jun-19				Complete		A Drinking Water Quality Policy is in preparation		Policy has been developed and was endorsed March 2019		
4	All	Document		Develop, document and implement a process for reviewing formal requirements every 12 months or where there are any changes to	1.2	Regulatory and Formal			Sep-2015	Medium	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed				13/12/19: Consultant has provided proposal to review and update DWMS	To be included as part of DWMS review and	
5	All	Training		Develop and implement a staff awareness program for relevant water quality obligations relating to their areas of responsibility.	1.2	Regulatory and Formal Requirements			Sep-2015	Medium	Manager Warrumbungle Water; Technical Officer	28-Feb-20		31/4		In progress				Quarterly review meeting to cover water quality obligations, alternate staff attendance at meetings. 28/2/20: To consider schedule of to er-implement water quality meetings	Re-implement quarterly meetings (after finalisation of improvement plan). Process to be formalised in updated DWMS (Action 334)	
6	All	Training		Formally document and communicate roles and responsibilities of staff relating to management of drinking water quality.	1.2	Regulatory and Formal Requirements			Sep-2015	Medium	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed				13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: Closed as included as part of action 334	How this is documented to be reviewed in updated DWMS (Action 334)	
7	All	Document		Develop a regular review process to update the list of stakeholders. Ensure contact details are current and all relevant parties are involved in	1.3	Engaging Stakeholders			Sep-2016	Low	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed				13/12/19: Consultant has provided proposal to review and update DWMS	To be reviewed as part of DWMS review and	Consultant
8	All	Document	Protocol	Update stakeholder/relevant agencies list to comprehensively identify all stakeholders who could affect, or be affected by, decisions or activities of the drinking water supplier. Where possible, this list should also identify the accountabilities and responsibilities of relevant agencies in support of the water supplier. This list will be included in this DWMS (in the main body) and maintained as a separate document referenced in Appendix D. It is also recommended that the contact register be inserted on a separate page so that it may be easily printed and posted on workplace walls.	1.3	Engaging Stakeholders			Mar-2015	High	Manager Warrumbungle Water	24-Jul-20		31-Oct-20		In progress	A draft ERP was developed by Bligh Tanner in collaboration with Council. Contact registers were developed for each scheme that now need to be completed (need input from operational staff).			Registers have been updated, further review still needed. Finalisation of ERP to be included as part of NSW Health project. ERP responsibility to be allocated, including setting review times 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H20 NSW Health project. 20/2/20 - Lists to be included in DWMS when updated	Following finalisation of ERP, stakeholder lists to be included in DWMS	
9	All	Document		Develop appropriate mechanisms for stakeholder commitment and involvement. Document the planned approach including partnership	1.3	Engaging Stakeholders			Sep-2015	Medium	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed				13/12/19: Consultant has provided proposal to review and update DWMS	To be included as part of DWMS review and	
10	All	Document	Protocol	The water supply system analysis, including the flow charts and catchment characteristics, will be reviewed internally in 12 months, and upon any significant changes to any of the water supply systems. The review process and records of the outcomes of these reviews should be	2.1	Water Supply System Analysis			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented				Flow chart reviewed as part of quarterly meeting. Flow charts updates in progress		
11	All	Operation		Enter all water quality monitoring data into electronic spreadsheets on a weekly basis. Allow for ease of data processing	2.1	Water Supply System Analysis			Mar-2015	High	Technical Officer	30-Jul-19				Implemented	This being done by Council's Technical Officer			All information is being entered electronically		
12	Mendooran	Reservoirs	Investigations	That WSC investigates options to reduce water age in the Coolabah rural residential estate water supply zone. This could include isolation of individual reservoirs i.e. Reservoirs No. 1, No. 2 and/or No. 3, on a seasonal basis to only store water volumes sufficient to meet peak day	2.1	Water Supply System Analysis	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Implemented			Included in S&S funding (R1)			
13	Binnaway	Backwashing	Operations	Perform regular testing of the following: · Filtered water turbidity immediately after a backwash · Wash water turbidity during a backwash · Filter headloss immediately after a backwash	2.1	Water Supply System Analysis	Hunter H2O Audit 2014	BIN009	2014	Medium	Supervisor Treatment	28-Feb-20	20/21	30/06/2021		Not started	Currently, water quality testing only occurs two hours after the backwash has completed. No testing is carried out on the filtered water after a backwash or wash water during the backwash sequence			Media replaced, reduced priority to medium. Covered by scoping study. Part of water treatment plant upgrades (FY19/20) 28/2/20: Consider online turbidity FY20/21 in advance of automation project		
14	All	Performance monitoring	Document	The assessment of the water quality performance data should be reviewed every 12 months, and upon any significant changes to any of the water supply systems. Review will assess any seasonal trends, consistent exceedances or other potential water quality issues. The formal review process and records of the outcomes of these reviews should be	2.2	Assessment of Water Quality Data			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented				Quarterly DWMS reviews undertaken Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting. Monthly report to General Manager of CCP exceedances		
15	All	Performance monitoring	Monitoring	Develop a central electronic spreadsheet to record results of operational sampling and testing to allow these results to be easily reviewed and analysed.	2.2	Assessment of Water Quality Data			Mar-2015	High	Technical Officer	01-Mar-15				Complete	Operational data is entered by Technical Officer on a weekly basis.					
16	All	Performance monitoring	Monitoring	Council to include new operational data prior to review of the DWMS.	2.2	Assessment of Water Quality Data			Sep-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Water quality data reviewed as part of quarterly meeting and annual DWMS review report		

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17	Coolah	Disinfection	Operations	Access to the safety shower/eye wash should remain unimpeded at all times. The safety shower eye/wash should be maintained in good working order. Breathing Apparatus should be immediately available on site but external to the chlorine room.	2.3	Hazard ID and Risk Assessment	DPI Inspections	DPI COH001	Jan-2019	High	Supervisor Treatment	24-Apr-20		13-Mar-20		Complete				Breathing apparatus to be included as part of FY19/20 (replace chlorine room). Tender to be developed. Checklist has been developed for safety showers/eyewash. 27/9/19: GR to get prices on eyewash/safety shower outside chlorine room; check with WHS officer re feasibility/recent audit 27/9/19: need info of equipment to be reused (alarming system + scales) + drone pictures (Coolah) 13/12/19: Breathing apparatus still to be made available. Project management resources - proposal has been sought 28/2/20: Eyewash not yet installed and breathing apparatus still to be made available. 24/4/20: Eyewash installed and breathing apparatus	Upgrade project also to include. Need info of equipment to be reused (alarming system + scales) + drone pictures (Coolah)	Project management resource sought
18	Mendocorn	WTP	Minor works	A small leak in the main RPZ installation post service water pumps needs addressing for WHS reasons and because it is inundating an access pit for the backwash flow meter.	2.3	Hazard ID and Risk Assessment	DPI Inspections	DPI MEN006	Jan-2019	High	Supervisor South	27-Aug-19		28-Aug-19	completed as 27-9-19	Complete				The main operator for the plant was unavailable on the day of inspection so a follow up inspection is planned to review the plant operation. It was noted that back flow prevention valves have been installed to prevent the reoccurrence of chemical backflows to the clear water tank. A small leak in the main RPZ installation post service water pumps needs addressing for	Leak has been completed	
19	Mendocorn	Service Water	Minor works	Repair service water system to supply water at pressure to the chemical dosing boards and safety showers. A backflow prevention valve should be installed post last connection for eyewash/safety showers to prevent this situation reoccurring. Council should satisfy themselves as to whether this should be a testable device. Consider running a service water line across to the laboratory for the purpose of treated water testing.	2.3	Hazard ID and Risk Assessment	DPI Inspections	DPI MEN009	Jan-2019	High	Supervisor South	27-Jun-19				Complete				The service water system at the water plant has not been functioning correctly since construction. The system is currently running off the town water supply which is not at a high enough pressure to efficiently run	Service water system has been repaired. Testable backflow prevention valve has been installed (2018). Service water line to no longer considered necessary.	
20	All	Documentation / Protocol		The hazard identification and risk assessment should be internally reviewed 12 months. Every five years (or upon any significant changes to any of the water supply systems) Council should undertake a comprehensive review. The review process and records of the outcomes	2.3	Hazard Identification & Risk Assessment			Sep-2015	Medium	Manager Warrumbungle Water	28-Feb-20		TBC		Closed				Review of risk assessment to be undertaken as part of NSW Health DWMS project risk assessment review 24/7/20: closed as included in new action A351		
21	Dunedoo	Disinfection	Minor works	Install the chlorine dosing pump on the existing wall mounted bracket	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	DUN004	2014	Medium	Supervisor South	22-Jan-19				Complete				The chlorine dosing pump is currently sitting on a bucket and not firmly attached to an appropriate support	Dosing pump has been mounted on the wall (late 2018)	

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22	Coolah	Safety	Minor works	Relocate the safety shower/eyewash station to outside of the dosing room. The safety shower must be: · Located within 10 seconds reach of the hazard · Located on the same level as the hazard and free from obstructions The location and installation of the safety shower eyewash must comply with Australian Standard AS4775-2007 Designate an evacuation assembly point for the site. The assembly point is to be sign posted and discussed in contractor/personnel inductions to site. The assembly point is to take into account proximity of chlorine dosing facility. More than one assembly point may be needed (depending on wind direction, one may be more appropriate than the other)	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	COH009, COH010	2014	Medium	Supervisor Treatment	28-Feb-20			6/03/2020	In progress		· The chlorine safety shower/eyewash station is currently located inside the chlorine dosing room. In the event of a chlorine leak, the unit would not be able to be used. This does not comply with Australian Standard AS4775-2007. · There is no designated evacuation assembly point		Evacuation assembly point to be allocated and sign posted. 13/12/19: Still to confirm if eye wash station has been installed. Signs have been ordered (evacuation and meeting point) and waiting to be delivered. 28/2/20: Eyewash station has not been installed. Signs have not been delivered.	Signs to be installed following delivery Investigate portable eyewash station	
23	Baradine	Disinfection	Minor works	Ensure the dosing room has adequate ventilation and install a chlorine gas leak detector	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BAR008	2014	High	Supervisor Treatment	24-Jul-20	19/20		30/05/2020	Complete	The chlorine dosing room is well laid out, clean and kept in an excellent condition. However, there currently is not a chlorine gas leak detector installed		Alarm has been installed (incl. gas detector). Works still to be completed on chlorine room (FY19/20) 13/12/19: Dependent on outcomes of review of need for plant upgrade/replacement 28/2/20 Quotes to undertake work are being reviewed			
24	Binnaway	Environmental	Minor works	· Redirect the drain flow from the soda ash/alum dosing room to the external alum bulk storage bund · Take measurements of the bund wall, the tank and determine the angle from the top of the tank to the bund wall and ensure the bund complies with Australian Standard AS3780 · Ensure the chlorine room ventilation complies with the requirements of Australian Standard AS2927 · Investigate if the forced ventilation fan needs to be larger to provide adequate ventilation	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BIN012, BIN013, BIN014	2014	High	Supervisor Treatment	24-Jul-20	19/20		25/11/2020	In progress	· Any spilled chemical in the soda ash dosing and storage area can potentially drain to the stormwater drainage system · The alum bulk storage bunding area may potentially not comply with Australian Standard AS with regard to appropriate angle from the top of the storage tank to the top of the bund wall · There is limited ventilation in the chlorine dosing room which is a potential safety		Investigation still needed To be included in treatment plant upgrades Chlorine room items covered under action 324 13/12/19: Have received quotes, sizing to be confirmed. HunterH2O audit to be undertaken next week, HunterH2O to confirm requirements 28/2/20- see update action 23 24/7/20: chlorine room items addressed (see also action 23); soda ash/alum bunding outstanding	To be included as treatment plant upgrades		
25	Coona	Lime dosing	Minor works	Ensure safety covers are installed that adequately cover all moving parts	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	COO010	2014	High	Supervisor North	27-Jun-19			31/12/2019	27/09/2019; were off at time of audit	Complete	Some equipment in the lime dosing room does not have appropriate covers that cover moving parts. This is a hazard for personnel injuring fingers etc.		Include in WTP upgrades FY19/20	To be included as treatment plant upgrades	
26	Coolah	Disinfection	Minor works	· Organise for chains to be installed to secure the cylinders in place and reduce the risk of the cylinders falling over · Investigate ventilation requirements as outlined in Australian Standard AS2927. Implement ventilation modification if required to comply with the Australian Standard. This may be achieved through improved forced ventilation or modification to the vents for cross ventilation · Chlorine gas is an oxidising agent and sources of fuel should not be stored in the same room. · Items stored on the ground in the room poses a trip hazard and should be	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	COH006, COH007, COH008	2014	High	Project Engineer	24-Jul-20			1/08/2021	In progress	· The chlorine gas cylinders are currently not stored in a secure manner. Gas cylinders should be stored securely on the site to reduce the risk of damage to the cylinder or other equipment dosing lines should a cylinder topple over. · There is currently no forced ventilation in the chlorine dosing room. · Redundant equipment and boxes are		Chains have been installed All other items to be addressed FY19/20 (replace chlorine room). Tender to be developed. 27/9/19 & 13/12/19: need info of equipment to be reused (alarming system + scales) + drone pictures (Coolah) 24/4/20: Cylinders have chains so can be secured 24/7/20: outstanding only is chlorine room upgrade			
27	Mendooran	Reservoir Hypochlorite	Minor works	· Cover and secure the dosing line and dosing point at the reservoir. · Install a chemical bund in the hypochlorite dosing room. Consider constructing a bunded fill point for the delivery vehicle	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	MEN014, MEN015	2014	High	Supervisor South	27-Jun-19				Complete	The sodium hypochlorite dosing line and dosing point is: · Exposed and unsecured. There is the potential for damage for damage, contamination or vandalism · Not currently bunded. Any chemical		Dosing line now in a covered pit. Tank is self bunded.			
28	BAR, CBN	Safety	Operations	Organise routine tagging of portable electrical equipment to reduce safety risks	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BAR014, COO015	2014	High	Supervisor Treatment, Director Environment Services	24-Apr-20			31/03/2020	Implemented	No schedule for electrical equipment tagging is currently in place		Manger sent email WHS representative - waiting for reply. 13/12/19: Baradine tagging has been complete. CBN still to be done 28/2/20: CBN still to be done. All depots have been done. Electrician to be engaged for CBN. 24/4/20: Electrician has been engaged	WHS representative to table at next committee meeting. Organise tagging for CBN Director to raise at senior level for issue across		
29	Bugaldie	Safety	Minor works	· Re-route the dosing line to reduce the risk of chemical contact in the event of a leak in the dosing line. · Remove redundant materials from the site shed and maintain housekeeping	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BUG007, BUG09	2014	High	Supervisor North	30-Jul-19			31/07/2019	Complete	· The hypo dosing line runs across the top of the ceiling. This increases the chance of operator contact with the solution should a leak occur in the line · The site shed contains material and objects that is untidy and poses a safety		Line has been moved and shed housekeeping has been complete			
30	Mendooran	Safety	R&D	Investigate methods to maintain a higher pressure in the eyewash station water line. This may include: · Booster pump	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	MEN010	2014	High	Supervisor South	27-Jun-19				Complete	The eyewash station experiences low pressure.		No longer an issue following change from town water to service water			
31	Dunedoo	Safety	Minor works	· Ensure that open pits have appropriate handrailing/fencing/bollards installed around the pit perimeter · Ensure confined spaces have appropriate signage installed · Remove redundant material from the site shed and ensure it is kept tidy and de-cluttered · Remove redundant signage from the site relating to chlorine gas and install signage appropriate to hypochlorite · Routinely (weekly) test operate the safety shower to flush the line and ensure that it is operating reliably. · Test and monitor the safety shower water temperature to ensure that it complies with the appropriate Australian Standard. · Tidy switch room and either dispose of redundant equipment or store at the	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	DUN011, DUN012, DUN013	2014	High	Supervisor South	27-Jun-19				Closed	There are various safety hazards on site relating to the following issues: · Valve pits · Confined spaces · Housekeeping · Signage The safety shower is located outdoors and in an area exposed to sunlight		Open pits have been covered. Consultant to be engaged to develop register. Site has been tidied and redundant equipment removed. Hypochlorite signage has been added, gas signage removed. Decommissioned bore has been covered and locked Action closed, with outstanding items covered by action 336 and 337	Safety showers to be regularly tested (covered under action 336) Confined spaces to have appropriate signage (action 337)		

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32	Kenebri	Safety	Minor works	Ensure the water tank support structure integrity is inspected and repair as required Remove redundant materials from the site shed and maintain housekeeping Install signage on the access gate and chlorine dosing room indicating that hypochlorite is stored and in use Install a fire extinguisher on site and appropriate signage, including a contact list in case of an incident or emergency	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	KEN008	2014	High	Supervisor Treatment	24-Jul-20	19/20	30/06/2020		Complete	There are several site hazards that need to be controlled to reduce the potential for injury to personnel			New reservoir to be established on the ground. Current system to be demolished and decommissioned. 13/12/19: New reservoir is in place. Demolition of old reservoir being arranged 28/2/20: Getting quotes for removal of old reservoir. Signage is being organised. Fire extinguisher to be installed and added to schedule to inspect (Property Officer) 24/4/20: Signs ordered for all sites, hazmat tubes to be installed. Fire extinguishers planned to be installed in May 24/7/20: old reservoir demolished; shed repaired; signage & HAZMAT info installed; fire extinguisher installed (as well as BUG) with 6-monthly service this month		
33	BUG, KEN	Safety	Minor works	Ensure the plant has an eyewash station or kit should an incident occur with the buschle device system	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	KEN009, BUG014	2014	High	Supervisor North	13-Dec-19		31/10/2019 was 30/9/19		Complete	There is no safety shower on site			Currently investigating all shower / eye washes (North) 13/12/19: Details request for fixtures has been submitted		
34	Bugaldi	Safety	Minor works	Ensure the water tank support structure integrity is checked and repaired as required Install a fall arrest or ladder cage to reduce the chance of a fall when accessing the reservoir Install a lockable cover at the base of the ladder to prevent unauthorised access Install a handrail around the tank platform	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BUG008	2014	High	Supervisor Treatment	24-Jul-20		30/06/2021		Closed	The reservoir ladder and support structure does not contain any of the following: Fall arrest system Cage Lockable cover Handrail around the outside edge These risks made higher given the fact that the site is easily accessible to the public			Structural integrity to be investigated further. Rest of action covered by action 333 WHS access upgrades (does not include structural integrity of support structure) 27/9/19: ladder is off the ground -> manproof fence? WEARS looked at tank stand integrity 13/12/19: Still to be investigated 28/2/20: Consider replacement of tank with onground reservoir with pump and back-up generator to remove working at height risk. Consider as part of risk assessment 24/7/20: do similar set-up to KBI - approx. \$20k; quote for	Consider as part of reservoir upgrade program.	
35	BAR, DUN, KEN	Security		Ensure facility is securely locked, public access is prevented and all access ways are secured when the operators are not onsite	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BAR011, DUN010, KEN007	2014	High	Supervisor North; Supervisor South	30-Jul-19				Complete	The facility has poor security, is sometimes left unlocked with unattended and/or is easily accessible once inside			All sites are locked, electronic keys have been installed for all sites.		
36	Mendo	Security	Minor works	Install a lockable door and ensure access to the treated water tanks and/or	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	MEN011, MEN010	2014	High	Supervisor South	27-Jun-19				Complete	Critical equipment is currently			Completed April 2019		
37	BWY, CLH, MDN, KBI	Signage	Minor works	Install signage on the front entrance to indicate Plant contact details and hazardous materials are stored on site. Install appropriate signage displayed that indicates the following information: Chemical contained within the room Chemical UN no. Chemical category/classification with appropriate symbol Install a fire extinguisher with appropriate signage on site and include an emergency contact list in case of an incident or emergency	2.3	Hazard ID and Risk Assessment	Hunter H2O Audit 2014	BIN008, BIN015, BIN016, BUG010, COH011, MEN013	2014	High	Supervisor Treatment; Technical officer	24-Jul-20		31/03/2020		Complete	Insufficient signage on site entrance and/or chemical dosing and storage rooms The front entrance gate currently has no signs installed indicating that there are hazardous materials stored on site There is insufficient signage on the alum and soda ash chemical storage and dosing facilities			MND, CLH entrances have signage; 27/9/19: SS not heard from supervisors; GR to advise on BWY; added KBI; BUG/KBI have liquid chlorine only; HAZCHEM signs at most places (BUG/KBI) + need SDS on site in folders (AM will do himself next week) 28/2/2020: HAZCHEM signs installations are being installed. Fire extinguishers to be arranged. 24/4/20: Fire extinguishers planned to be installed in May. All		
38	Mendo	Catchment & Abstraction	Investigations	Continue to investigate sanitary quality and security of back-up bores aquifer.	3.1	Preventive Measures and Multiple Barriers	CWT report May-15		Jan-2015	Very High						Complete	(Section 4.1, p.6 of CWT report)					
39	All	Documentation / Protocol		The identification and evaluation of preventive measures should be internally reviewed 12 months. Every five years (or upon any significant changes to any of the water supply systems) Council should undertake a comprehensive review. The review should also consider whether existing control measures are being undertaken, their effectiveness and whether they are appropriately documented and formalised. The review process	3.1	Preventive Measures and Multiple Barriers			Sep-2016	Low	Manager Warrumbungle Water	24-Apr-20		31-Oct-20		Closed				Risk assessment review to be completed as part of NSW Health DWMS project (Hunter H20) 24/4/20: As part of NSW Health project, commencing, dependent on COVID restrictions for initial site visits 24/7/20: closed as included in new action A351	Schedule to be reviewed as part of DWMS review and update (action 334)	
41	BIN, BUG, CBN, KEN	Catchment & Abstraction	Minor works	Timor Dam fence was damaged during the bushfires. Animal ingress is possible, fence to be replaced. Follow up with Council engineer the status of the fence replacement program. Some funding is available from insurance claim.	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.05	Mar-2015	High	Supervisor North	13-Dec-19		31-Dec-19		Complete	Walked fence line to assess extent of damage; Started re-erecting fence in some places; budget ran out in FY15/16?			Most of the fence has been repaired. Remaining repairs have been scheduled (December 2019, ID 25) 13/12/19: Fencing has been complete		
42	Coolah	Reservoirs	Investigations	It is recommended that Council assess the reservoir and determine whether the reservoir can be brought up to standard cost effectively. Some improvements were made to the roof/flashings several years ago but there remains significant security issues which would allow entry of birds and vermin into the reservoir. Assessment should evaluate whether the reservoir can be effectively bird/vermin proofed or whether the roof and roof structure need to be replaced. Part of this consideration will be accessibility for diving contractors, whether hatches meet current standards and how any level sensors/telemetry cables or other roof penetrations can be weather proofed. Hatches/entry points should extend a minimum of 100mm above the roof line to exclude stormwater and should be able to be locked to prevent unauthorised entry. As the reservoir is showing signs of leakage some consideration should also be given to structural soundness and whether the reservoir can be lined/waterproofed. A young tree growing immediately adjacent to the reservoir should be removed to prevent any potential damage by roots.	3.1	Preventive Measures and Multiple Barriers	DPI Inspections	DPI COH003	Jan-2019	High	Project Engineer	27-Aug-19		31-Oct-19		Complete				Entry hatches have been replaced (May 2019) Structural assessment has been undertaken. Integrity issues complete Tender to be prepared to undertake external concrete repairs. Reservoir to be replaced FY23/24	Tender to be prepared to undertake external concrete repairs.	
43	BUG, KEN	Reservoirs	Operations	Inspect elevated water tanks and ensure that they are vermin proof/ secure them from contamination.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	13-Dec-19				Complete	2018-05: BUG: Operational staff used drone to inspect tank. This revealed a collapsed roof which was repaired. KBI: Reservoirs are due for replacement due to structural issues of the tank stand.	check with neighbouring Councils? Gil? Send email to all; AM to look at it (email); approach: inspect first,	BUG is secure KEN system to be replaced by end of September 2019 (ID 3) 13/12/19: Kenebri system has been replaced with two tanks and pump (completed in October 2019)			
44	Bugaldi	Disinfection	Investigations	Establish the maximum flow rate and confirm CTs.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	29-Aug-18				Complete	2018-05: Refer to recommendation above. Bligh Tanner estimation re flow rate	doubling up from extreme				
45	Baradin	Reservoirs	Operations	Clean reservoir to remove sediment.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	29-Aug-18				Complete	2018-05: Planned to occur in week 18/06/18.	done				

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements
46	Baradin	Disinfection	Operations	CT/clear water tank contamination: Discuss need for precautionary boil water alert with PHU/DPI Water OR increase chlorine concentration to 4 mg/L to maximise CT.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Complete	2016-10: None of this was done as considered not necessary by Manager WW-Operations & DTS after consultation with DPI Water (reason?). 2018-05: The CCP target for disinfection was 1.4 - 1.5 mg/L as of 3/2018 but is higher on average (1.55), new target after DWMS meeting: 1.4 - 1.8 mg/L. Reservoir mixer will be installed in FY2017/18.	Follow up discrepancy between chlorine measurements at plant and in retic --> SS; NaOCl absorption issue Fe/Mn - dose prior to clarifier (e.g. run into the launder) BUT increased clarifier corrosion --> AM; recalc/confirm current CT (tank dimensions); install inline static mixer (increase baffle factor??? NO); relocate	Need to measure clear water dimensions and inspect baffling system or find drawings	Integrity issues have been fixed (May 2019). Actions marked as complete. Separate action 326 to review CT.		
47	CLH, DUN	Catchment & works	Major Abstraction	Decommission the abandoned bore (CLH). Decommission the old well in the WTP building (DDO).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high				29-Aug-18		Complete	2016-10: bore openings covered (photographic evidence available); 2018-05: Q - is 'decommissioning' different to 'sealing bores'?	what does decommission mean?; is the level off the bores? Not				
48	BUG, BDN, KBI	Catchment & works	Investigations	Bore investigations (integrity, capping, geology, exclusion zones - fencing)	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Supervisor Treatment	24-Jul-20		30-Jun-21		Closed	integrity/capping being looked at; BUG no fence around bore (allocate budget); KBI/BUG septic on bore side of house --> septic tank register/inspection (regulatory services); NSW Health testing should start; BUG deep/KBI a bit shallower 31/10/2018: Supervisor North; quotes for BUG fencing; Manager talk to regulatory services			Contractor to inspect first week of September 19, and provide quote to address integrity issues at bores (BUG, BAR, KEN) 13/12/19: Inspections have been carried. 28/2/20: Works still to be undertaken. Oriana project to review and fix bore casings. 24/7/20: fencing BUG see item 34; assume no (updated) septic tank register or mgt system within Council; bore integrity covered as part of reservoir upgrade project - WEARS to provide quotes; OWUA project: need update from OWUA (issue DP focus activities) closed as included in new	Consider as part of reservoir upgrade program.	
49	Baradin	Catchment & works	Minor Abstraction	Cap the abandoned bore.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Medium				29-Aug-18		Complete		2018-05: One bore has been capped, two other openings have been closed with rubbered flanges. 2019-05: need to investigate (considering depth of bore)				
50	BUG, BAR, KEN	Catchment & works	Investigations	Private water bore inspections, bore register	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Manager Warrumbungle Water; Technical Officer	24-Jul-20		20-Mar-20	Interim (Tech officer)	Not started	Can we obtain a list of private bores from DPI? Bruce Lamont to advise if DOI can give us a list (Doug Moorby did similar exercise)	contamination from same aquifer		13/12/19: Discussion at Oriana meeting and with NSW Health advised against providing any such communication due to perceived risk. Still considered to be a risk. Comms notice to also consider water security. 24/7/20: no progress; media release recommended	Consider Media / comms for residents on importance of water security and contamination of bores, sustainability. Investigate information	
51	Baradin	Disinfection	Major works	re CT: Change reticulation configuration so all water must go through reservoir prior to delivery to town OR install new chlorine contact tank of sufficient size to provide adequate CT.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Closed	2016-10: Alternative and less costly suggestion to improve CT and guarantee appropriate disinfection: modify end of inlet pipe into clear water tank (e.g. perforated cap/pipe extension) for better distribution of inflowing water into tank. 2018-05: Need to measure clear water tank dimensions and assess current baffling system/find drawings to calculate CT more accurately; increase chlorine dosing to 2mg/L - need to notify residents in advance.	doubling up from extreme; an additional tank could be installed above ground between filters and underground clear water tank, dose chlorine in it -->		Action closed. Refer to action 326		
52	Mendooran	Catchment & works	Operations	Inspect the (back-up) bore and ensure integrity.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16			Very high	Supervisor South	27-Jun-19				Complete	Supervisor South - to check integrity 2016-10: Note - Intake is flood prone! 2018-05: Back-up bore not being used, control philosophy needs to be			Integrity of back up bore has been checked and is not an issue		
53	All	Distribution	Investigations	Identify high risk areas for backflow prevention (i.e. STP)	3.1	Preventive Measures and Multiple Barriers	Risk assessment	10.01	Mar-2015	High	Manager Warrumbungle Water; Technical Officer	24-Jul-20		31-Oct-20	Interim (Tech officer)	In progress	Need backflow prevention policy Regulatory services police (that they do it properly); need RPZ register (including inspection intervals) STPs, SPSS, dump points, parks/gardens (chemicals) - standards? Hospitals, dentists,	consultant to develop? Get proposals (e.g. Key environmental) Supervisor North to get proposals/funding (SS follow up with Mark Nave)? Check with regulatory		Policy and register and inspection program still to be developed 13/12/19: Engaged consultant, to review documents produced 28/2/20: Policy and procedure produced and reviewed. Council to adopt. Consultant also developing register, which should identify high risk areas. 24/7/20: policy and register drafted, however finalisation cannot occur until fees/charges are clarified and Council internal register set-up + admin resources allocated (Tech Officer position currently vacant)	Tech Officer liaise with consultant and investigate setup register in council systems (Authority)	

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54	BAR, BIN, CBN, MDN	Coagulation & works	Minor	Online interlocks for pH and turbidity on outlet for filters	3.1	Preventive Measures and Multiple Barriers	Risk assessment	3.02	Mar-2015	High	Manager Warrumbungle Water	28-Feb-20		30-Jun-21		Closed	MDN has interlock; rest discussed - will be with upgrades (SCADA/Automation)			Scheduled as part of automation project. Project plan ID 35 28/2/20: Scoping study is underway Closed, as part of automation project (action 328)	To be included as part of process monitoring, automation and instrumentation project	
55	All	Whole of System	Investigations	Electronic key system currently being investigated	3.1	Preventive Measures and Multiple Barriers			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Complete	Manager WW - Operations/ Manager Property & Risk?	2018-05: Note - budget for CBN sewer sites		Complete first week of August 2019		
56	Bugaldie	Distribution	Investigations	Consider options to improve water pressure to limit risk of ingress into reticulation mains.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Medium	Technical Officer	30-Jul-19				Closed			2018-05: Note - in light of this comment, replacement of KBI system with BUG like system is not	Not considered viable.		
57	Mendocorn	Catchment & Abstraction	Investigations	Assess the need for additional barriers to be implemented in the catchment area to protect raw water quality.	3.1	Preventive Measures and Multiple Barriers	CWT report May-15		May-2015	High		01-Mar-19				Closed	(Section 4.1, p.6) riparian zone next to river; educate farmers/pump up from river to troughs; stock routes? - rangers; cannot enforce	check this section out; 5km upstream from intake; unrealistic; procedure: high rain event switch over to	Cannot do. Action closed			
58	Baradine	Reservoirs	Minor works	re clear water tank: Establish integrity to prevent contamination/vermin ingress AND fix holes in WTP building to prevent vermin getting inside.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Complete	Photographic evidence available. Needs more sustainable solution			Completed May 2019		
59	CLH, DUN	Catchment & Abstraction	Minor works	Seal the bores (incl. covering the abandoned one - CLH).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor Treatment	24-Apr-20		6/03/2020		Complete	2016-10: Pictures with evidence/before-after comparison available. Expanding foam for operational CLH bore is only a temporary solution. 2018-05: Money included into capital budget FY18/19 to seal operational CLH bore (within frame of reservoir upgrade) and concrete cap	is there a standard for capping/plugging bores (AS) -- MG (chase with Dale); WIS to seal bores	Coolah bore to be capped (ID 15) 13/12/19: Current bores in Coolah have been sealed. Contractor has been engaged to cap bore at Coolah. 28/2/20: Dunedoo in a raised shed, is enclosed in shed. No gaps in integrity. 24/4/20: CBN has been sealed, Coolah sealed 24/4/20			
60	Kenebri	Disinfection	Investigations	Determine configuration of tanks and re-configure to be in series if possible to increase CT.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Closed	2018-05: Tanks are currently not in series. The reservoirs require replacement. Replacement design will account for sufficient CT.	reservoirs require replacement, \$100k budgeted in FY2018/19, quote received; pump energy cost will increase with	To be progressed 27/9/19: covered under ID 43 (new tanks should have sufficient CT - more than BUG)			
61	BUG, KEN	Catchment & Abstraction	Minor works	Seal the bore (BUG) borehead (KBI).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	30-Jul-19				Closed	2016-10: Operational staff performed temporary sealing (photographic evidence available) 2018-05: More sustainable solution required (more	combine double ups?	Closed, covered by action 48			
62	Baradine	Reservoirs	Operations	re clear water tank: Thoroughly clean the WTP building to remove all bird faeces (care to be taken to not allow cleaning water to enter the clean water tank).	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19	19/20	31-Oct		Complete	2018-05: Note - inside of walls cannot be cleaned due to the wall material being asbestos + most areas located in very high places/inaccessible. Obtained a quote to upgrade clear water tank to comply with Circular 18, including cleaning, included in FY2018/19 capital			Majority cleaned (all droppings around CWT have been removed, only high areas on asbestos). Have repaired holes to prevent further ingress by birds/vermin. Budget to replace external walls (FY19/20) to help prevent further ingress/WHS issues. 13/12/19: External work to remove asbestos has been deferred. Waiting on clarifier status. Majority has been cleaned,		
63	Baradine	Reservoirs	Minor works	Repair reservoir to prevent vermin ingress.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	WIS	27-Jun-19	2018/19			Complete	2018-05: Obtained quote to upgrade reservoir to comply with Circular 18 +			Completed May 2019		
64	Baradine	Catchment & Abstraction	Minor works	Seal the operational bore.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Medium		27-Aug-19				Closed		2018-05: Temporary sealed by operational staff (with silicone), more sustainable solution required. 2019-05: part of WEAS engagement	Closed, covered by Action 48			
65	Binaway	Reservoirs	Minor works	Ensure that the reservoir is adequately sealed from vermin and rainwater ingress.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	Manager Warrumbungle Water	24-Jul-20	19/20	31-Dec-20		Complete	2018-05: Obtained quote to upgrade reservoir to comply with Circular 18 + included in FY2018/19 capital budget.			Last inspected Feb 2019. Covered by action 333. 13/12/19: Have a quote for works to fix integrity. Contractor to be engaged 28/2/20: Purchase order given to contractor. Waiting for contractor to schedule site visits. 24/4/20: Have manufactured required hatches, postponed due to COVID restrictions (unable to cross border) 27/4/20: WEARS been on-site and installed new hatch; reservoir sealed (however WEARS needs to come back to		
66	CBN, MDN	Reservoirs	Minor works	Seal all points of ingress into the clear water tank AND Establish integrity of all reservoirs.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	WIS	30-Jul-19	2018/19			Complete	2016-10: Temporary sealing done by operational staff (photographic evidence present). 2018-05: Obtained quotes to upgrade tanks/reservoirs to comply with Circular 18 + included in FY2018/19			CBN and MDN clear water tank have been sealed Reservoirs integrity have been fixed		
67	CLH, DUN	Reservoirs	Minor works	Vermin proof the reservoirs.	3.1	Preventive Measures and Multiple Barriers	Bligh Tanner report Feb-16		Feb-2016	Very high	WIS TBD	30-Jul-19	2018/19			Complete	2018-05: Obtained quotes to upgrade reservoirs to comply with Circular 18 +			Dunedoo reservoirs complete. Marked as complete, as Coolah reservoirs covered by action 185		

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68	Baradine	Clear water tank	Major works	Seal the clear water tank against vermin and contaminants. Install bunds around the chemical dosing systems.	3.1	Preventative Measures and Multiple Barriers	Hunter H2O Audit 2014	BAR010	2014	High	Supervisor Treatment	24-Jul-20		13/04/2021		Closed	The clear water tank is not sealed/protected and is potentially exposed to chemical spills or vermin			CWT sealed. Bund has been purchased, waiting to be installed. 13/12/19 & 28/2/20: Bund installation waiting on recommendations for WTP upgrades/replacements (related to action 78) 24/7/20: see last comment; installation of bund + sump required in chem dosing area (to put of alum tank bund);	Bund to be installed, building modifications to be complete prior to installation.	
69	Mendocorn	Filtration	Critical control point	Review filtration CCP to be in line with ADGW recommendation (<0.2 NTU).	3.2	CCPs	CWT report May-15		May-2015	Very high		29-Aug-18				Complete	2016-10: (Section 3, p.5 of CWT report); CCP reviewed by Bligh Tanner (Jan-16); target reduced to <0.3 NTU (from <0.5), recommended: lower CCP 'with water quality triggers' (for BW?) 2018-05: CCP of <0.2 NTU has been					
70	CLH, DUN	Disinfection	Critical control	Implement high level action and critical chlorine limits in CCPs	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Very high						Complete	Refer to current CCP reference guide					
71	All		Document / Protocol	The HACCP Summary Tables should be made readily accessible to operators (e.g. pinned up at the treatment plants and Council offices).	3.2	CCPs			Mar-2015	High	Manager Warrumbungle Water; Technical Officer	30-Jul-19				Complete	CCP tables were supplied to supervisors/operators; however, only some plants (Binnaway, Kenebri, ...) had them displayed during Bligh Tanner's site visits in Jan-16. Manager WW - Special Projects provided updated CCP tables to Technical Officer for re-distribution to supervisors/operators again with clear instructions (Tech Officer to document this)			CCP tables displayed at all sites. Laminated CCPs in trucks of distribution staff. Staff now also highlighting sheet entries (hardcopy) if outside target.		
72	All		Critical control point	The identification of CCPs and Critical Limits should be reviewed every year, and upon any significant changes to any of the water supply systems. The formal review process and records of the outcomes of these reviews should be documented. The DWMS documentation should also be updated accordingly.	3.2	CCPs			Sep-2015	Medium	Manager Warrumbungle Water	29-Aug-18				Implemented	Complete 2016, due Jan-17			CCP review was performed by Bligh Tanner in January 2016 and documented in the DWMS Implementation		
73	BAR, BIN, CBN	Fluoridation	Critical control point	Council to include a fluoride CCP at Binnaway, Baradine and Coonabarabran, upon next review of DWMS.	3.2	CCPs			Sep-2015	Medium	Manager Warrumbungle Water	29-Aug-18				Complete	Bligh Tanner consultant, Manager WW - Special Projects			Was done by NSW Health consultant from Bligh Tanner in collaboration with Council. 2016-10:		
74	BWY, CBN, MDN	Sedimentation / Protocol	Document	Establish an Operational Control Point (OCP) for the settling lagoon	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Medium	Manager Warrumbungle Water; Technical officer	28-Feb-20		31-Mar	13/3 (long term trends)	In progress				27/9/19: turbidity; pH (e.g. should be 6-7 if alum is used) 28/2/20: Supervisor to propose OCP (>3 NTU, pH dependent on coagulant)	Technical officer to prepare long term trends. Supervisor to propose OCP	
75	CBN, MDN	Sedimentation / Protocol	Document	Establish an OCP for the sedimentation lagoons.	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Medium	Manager Warrumbungle Water; Technical officer	27-Sep-19		31-Dec		Closed				2016-10: CBN: Introduce action limits on water quality requiring actions such as jar testing, optimising alum/polymer dose rates, switch between lagoons. MDN: enhanced management, e.g. when to undertake jar tests and	Discuss setting OCP at quarterly review meeting. Technical officer to prepare long term trends	

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76	BIN, CBN, MDN, CLH, DUN	Catchment & control point	Critical	If sand bed demonstrates effective filtration consider making this a CCP	3.2	CCPs	Risk assessment	1.02	Mar-2015	Medium	Manager Warrumbungle Water	29-Aug-18				Closed						
77	Coonabarabran	Filtration control point	Critical	Review filtration CCP target and limits to be in line with ADWG recommendation (<0.2 NTU).	3.2	CCPs	CWT report May-15		May-2015	Very high	Supervisor Treatment	24-Jul-20	19/20	30-Jun-20		Complete	2016-10: (Section 2.1, p.4 of CWT report); CCP assessed by Bligh Tanner (Jan-16) but value not yet been lowered (currently target <0.8 NTU, recommended <0.3 'with water quality triggers') 2018-05: target set to <0.3 NTU in March 2018. Operators voiced concerns that this cannot be achieved once raw water turbidities increase. Requested funding through NSW Health to perform a filter media inspection to assess if media requires replacement.	filter inspection? NSW Health, Mark Nave to follow up; Hunter H2O BWY report to NSW Health; depends of funding from NSW Health, otherwise needs to come out of WTP	Currently using emergency back up bores. Filter media inspection undertaken recently (never been replaced). Turbidity target limit has been changed to 0.3 NTU, operational limit 0.5 NTU. Will have difficulty in meeting limit when source water is changed to the dam water. 13/12/19: Following improvements to filter, reduced critical limit should be able to be achieved when source water is changed 28/2/2020: Filter needs to be refurbished prior to media replacement. Have repaired area where there was bypassing. Result have improved. HunterH2O is providing a proposal to assist with replacement with sourcing and	Filter upgrade		
78	Baradine	Filtration control point	Critical	Reduce CCP limits for turbidity AND initiate backwashes based on water quality	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor Treatment	24-Jul-20		31-Dec-20		Closed	2016-10: CCP target got reduced to <0.2 NTU (from <0.8) 2018-05: Safe and Secure EOI submitted for 'Automation and Process Instrumentation Upgrade', including online instrumentation. Lab turbidity meter included in FY2018/19 capital budget. 2018-11: NTU meter purchased and in use			Limits previously reduced. Current iron and manganese issues (long term issue in winter) Limit of 0.2 NTU difficult to meet in winter. Started dosing chlorine dosing prior to clarifier, impact not yet seen. 27/9/19: HH2O will do filter inspection and trouble-shoot (Health project); settled water and filtered water NTU are currently the same(!); BW done every day, if increase in NTU another one is done 13/12/19: Filter inspection are complete, waiting on report. Filters need replacing. 28/2/20: Waiting on clarifier project to be resolved. NSW Health have been involved in discussions are reviewing with DPIE 24/4/20: Budget for filter replacement, however this needs to be replaced at same time as clarifier. 9 April 2020	Waiting on clarifier and filter replacement	
79	Binnaway	Filtration control point	Critical	Set more challenging filtration CCP limits	3.2	CCPs	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor South	27-Jun-19				Complete	2016-10: CCP target got reduced to <0.6 NTU (from <0.8); BW needs optimising + filter media replacement (refer to recommendation under 'Equipment Calibration & Maintenance') 2018-05: Filter media replacement planned starting			CCP limit reduced to 0.2 NTU (March 2019?) Filter media replaced (June 2018) Generally meeting new limits.		
80	All	Training		Relevant staff members must be trained to ensure they understand what the CCPs are and why they are important. This training should include use of the HACCP Summary Tables, associated target, Alert and Critical Limits, as well as the monitoring requirements to ensure the CCPs remain in control.	3.2	CCPs			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Implemented	Managers WW - Operations & Special Projects, HR, Supervisors			Staff are trained as part of inductions. When CCPs are changed, updated CCP tables are provided and discussed at quarterly meetings (Supervisor/Team Leaders). Changes are passed on to operators via tool box talks.		
81	Mendooran	Critical control point		That WSC finalise draft CCPs provided the DWMS Implementation Report (Bligh Tanner, 2016) and include an additional WTP Final pH CCP	3.2	Critical Control Points	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented		pH COP introduced for Mendooran WTP. CCP cannot be implemented as pH cannot be controlled, only monitored. COP reference guide and introduction of final pH CCPs/COPs for				
82	Mendooran	Wash water	Investigations	Consider a sedimentation stage with long residence times prior to returning the wash water to the inlet works. This may be achieved through installing baffles in the lagoon to reduce short circuiting	3.2	Critical Control Points	Hunter H2O Audit 2014	MEN007	2014	Medium	Manager Warrumbungle Water	24-Apr-20		30-Sep-20	Interim (finish concept design)	Closed	Wash water is directed to the sedimentation ponds for recovery. A concentration of contaminants unable to be removed in the sedimentation process may occur increasing the load on the filters			Covered by Mendooran water supply modification upgrade. Currently at concept design stage. Further funding will be needed for construction. 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 24/4/20: Consultant has submitted documentation (site constraint and design report). Have had meeting with Consultant on progress this week. Consultant to submit further information needed to progress. Action closed, as now covered into new combined Action 84E	Find funding following concept design finalisation (liaise with DPIE)	
83	Coolah	Disinfection	Process	Implement process to identify when gas bottle is empty	4.1	Operational Procedures	Risk assessment	7.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor	27-Jun-19				Complete	Automatic changeover between duty and standby bottle was implemented	follow up: scales for bottles (cost?)				

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84	All	Reservoirs	Investigations	Assess compliance regarding reservoir access with Australian Standards and common sense	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor Treatment	28-Feb-20		30-Jun-20		Closed	Aqualift inspection was performed and report with recommendations supplied. BUG and KBI were not inspected. The report has been partially actioned on, further actions dependent on financial and staff resources (see feedback issues)			Contractor has been engaged to assist with working at heights access to reservoirs. Work to improve access ongoing. 13/12/19: Engaged WEARS to undertake this work 28/2/20: Action closed as covered by new action 343	Follow up with WEARS	Project management resource needed	
85	All		Documentation / Protocol	Formally document any procedure related to existing control measures identified in the risk assessment that are not currently documented. Involve relevant staff in the development of these procedures.	4.1	Operational Procedures			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant	
86	All		Documentation / Protocol	Compile all SOPs into an operations manual	4.1	Operational Procedures			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19		See A15		Closed					Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant
87	Mendooran	Sedimentation	Investigations	Investigate pH increase between raw and settled water.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Supervisor Treatment; Manager Water	24-Apr-20		30-Sep-20	Interim (finish concept design)	Closed	(Section 4.2.3, p.11)				24/4/20: Consultant (CWT) has looked at issue current concept design, probably due to algae. Action closed, as now covered into new combined Action 345	Check that this issue is covered in recent CWT report and if any	
88	Mendooran	Disinfection	Investigations	Consider switching to chlorine gas disinfection.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water	24-Apr-20		30-Sep-20	Interim (finish concept design)	Closed	(Section 4.2.5, p.16)				Included as part of Mendooran upgrade 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 24/4/20: Consultant (CWT) has looked at issue current concept design 28/2/20: Action closed, as now covered into new combined Action 345	Refer to other action 171. Include pH and settled water investigations (action 87) Find funding following concept design finalisation (liaise with	
89	Mendooran	Distribution	Documentation / Protocol	Implement a pro-active mains flushing program.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Supervisor Reticulation; Technical Officer	24-Apr-20		30-May-20	Interim (order and print books)	In progress		(Section 4.3, p.17)			Schedules for Dunedoo still be developed. 27/9/19: waiting on Graham (flushing points DDO+MDN) 24/4/20: Flushing has been undertaken (exc Coolah and Dunedoo), but not formalised. Marty has picked points for a flushing program for all sites. Schedule to be put into a carbon	Order and print books	
90	All	Distribution	Documentation / Protocol	Develop a communication protocol around monitoring data (i.e. distribution data feeding back to WTP)	4.1	Operational Procedures	Risk assessment	10.01	Mar-2015	Medium	Manager Warrumbungle Water	01-Sep-15				Complete				Communication protocol is described in CCP document			
91	Coonabarabran	Filtration	Investigations	Confirm adjustments to backwash regime onsite to ensure they are effective.	4.1	Operational Procedures	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water; Supervisor North	27-Sep-19		31-Dec-19		Closed					Filter inspection undertaken identifying filter control issues. Refer to ID 150	Consultant to provide proposal to investigate. To be included as part of process monitoring, automation and instrumentation project	
92	Coonabarabran	Disinfection	Investigations	Investigate the chlorine demand of the treated water in the reticulation to determine optimum chlorine dose at WTP.	4.1	Operational Procedures	CWT report May-15		May-2015	High	Supervisor South	27-Jun-19				Closed	2016-10: (Section 4.3, p.16 of CWT report)				No longer an issue (following mains replacement, flushing program etc.)		
93	All	Clarification/ Sedimentation	Investigations	Strategy needs to be developed for continued supply during times of significant maintenance (e.g. utilising the lagoons temporarily)	4.1	Operational Procedures	Risk assessment	4.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed					No longer considered necessary		
94	Mendooran	Distribution	Documentation / Protocol	The water supply system diagram (Figure 2.1.9 Mendooran System Flow Diagram) from the WSC DWMS (17 th Oct 2014) be corrected and updated to accurately reflect the operational arrangement of the Mendooran Water	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete							
95	Coonabarabran	Disinfection	Operations	Target a lower pH for disinfection.	4.1	Operational Procedures	CWT report May-15		May-2015	High	Supervisor South	27-Jun-19				Closed	2016-10: (Section 4.2.5, p.16 of CWT report)				Action closed. pH within target range, with adequate CT.		
96	Coonabarabran	Filtration	Operations	Consider periodic inspection on filter media	4.1	Operational Procedures	Risk assessment	5.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented					Filter inspection carried out in June 2019		
97	Mendooran	Disinfection	Documentation / Protocol	That the EHO provides a copy of water quality results to WTP Operators at the time of onsite sampling and testing and/or leaves these results at the WTP. Any CCP exceedances or un-usual results recorded by the EHO are to be immediately reported to WTP Operators and W&S Manager.	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete							
98	All	Reservoirs	Investigations	Consider reviewing mixing options for reservoirs with common inlet/outlet	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	Medium	Manager Warrumbungle Water; Supervisor Treatment	24-Apr-20		30-Jun-20	Interim (determine reservoirs & engage)	In progress					24/4/20: Consultant has provided a proposal to look at mixing options. Binnaway reservoir has issues with water age. Other reservoirs with issues are included as part of other projects or are scheduled to be replaced. Reservoirs with C.t issue to be considered.	Council to look at which other reservoirs to be included based on Ct. Develop options for mixing. Reference Action 269	

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements	
99	Coonabarabran	Distribution	Monitoring	Consider sampling and testing program following mains repairs	4.1	Operational Procedures	Risk assessment	10.01	Mar-2015	Medium	Manager Warrumbungle Water	24-Apr-20		31-Dec-19	Interim deadline	Closed				This should be covered in relevant SOPs (Repair a water main break, Replace a water main) --> need to verify if this is the case	SWMS has been developed for main repairs. Testing is being undertaken for chlorine and turbidity following repairs. 24/4/20: Action closed as requirements of this action have been included in action 339 Develop System wide SOPs	SOP to be developed for pipe break repairs (and include monitoring) To be included as part of Action 339.	
100	Coonabarabran	Distribution	Operations	Consider tanker filling from dead ends (if backflow prevention available)	4.1	Operational Procedures	Risk assessment	10.03	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Note: Especially relevant during times of water	Weekly flushing program in Coonabarabran (while high level restrictions are in place)		
101	ALL	DWMS	Document	Insert location of and quality information (i.e. version, last review date, Document owner) for existing operational procedures into the DWMS Document Register (Include review date, date created, responsible person,	4.1	Operational Procedures			Mar-2015	High	Manager Warrumbungle Water	27-Jun-19				Closed					Closed as covered by under new action 334, review and update DWMS.	Include as part of DWMS review and update (action 334)	
102	Mendooran	Document	Protocol	That WSC review its current organisational structure with a view to ensure that the management of WTP Operators and reporting lines of communication actively support the ongoing implementation of its DWMS and CCPs. WSC should then formally document the adopted organisational structure, clearly communicating roles and responsibilities of all staff relating to the	4.1	Operational Procedures	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented				Draft structure water and wastewater has been developed, discussed and partially			
103	ALL	DWMS	Document	Review operational procedures to determine what other procedures need to be developed in relation to managing drinking water quality (e.g. operational and maintenance processes for main breaks)	4.1	Operational Procedures			Mar-2015	High	Manager Warrumbungle Water; Supervisor	28-Feb-20		31-Mar-20		Closed	Waiting for standard SOPs being developed by NSW Health				Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant (NSW Health)
104	Coonabarabran	Aeration & Oxidation	Operation	Implement SOP for batching and dosing	4.1	Operational Procedures	Risk assessment	2.02	Mar-2015	High	Supervisor North; Supervisor South	28-Feb-20		31-Mar-20	Interim	Closed					Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant
105	Coonabarabran	Filtration	Document	Develop SOP for filter maintenance	4.1	Operational Procedures	Risk assessment	5.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor South	28-Feb-20		31-Mar-20		Closed					Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant (NSW Health)
106	Coonabarabran	Reservoirs	Operation	Consider a routine reservoir inspection (checking locks etc.)	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor	27-Jun-19				Closed					Closed. Weekly inspection, recorded in plant diary. Refer to action 310.		
107	Coonabarabran	Reservoirs	Document	Develop SOP for the access of reservoirs	4.1	Operational Procedures	Risk assessment	9.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor	28-Feb-20		31-Mar-20		Closed					Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest	To be included as part of action 343	Consultant
108	Coonabarabran	Distribution	Document	Develop SOP around distribution failures such as main breaks, sufficient flushing, cleaning of tools	4.1	Operational Procedures	Risk assessment	10.02	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor	28-Feb-20		31-Mar-20		Closed	Need to verify if SOPs exist for mains/service breaks/failures and if they are used (available to staff)				Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements
109	Coona barabran	Distribution / Protocol	Document	Consider developing a notification procedure for mains breaks	4.1	Operational Procedures	Risk assessment	10.02	Mar-2015	High	Manager Warrumbungle Water; Supervisor North; Supervisor South	28-Feb-20		31-Mar-20		Closed				Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant
110	All	Distribution / Protocol	Document	Consider closing household property meters prior to recommissioning	4.1	Operational Procedures	Risk assessment	10.02	Mar-2015	High	Supervisor North; Supervisor South	28-Feb-20		28-Feb-20	Interim (action 339)	Closed	Should be covered in relevant SOPs (Repair a water main break, Replace a water main) --> need to verify if this is the case			Hunter H20 is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H20 SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH20 - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H20). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant
111	Coolah and Duned	Distribution / Protocol	Document	Finalise flushing schedule for remaining systems (CLH, DDO nothing currently in place)	4.1	Operational Procedures	Risk assessment	10.03	Mar-2015	High	Supervisor South	30-Jul-19		31-Oct-19		Complete				Schedules for Coolah are to be printed first week of August. Dunedoo to still be developed. Action closed as covered by action 89.		
112	Coona barabran	Distribution / Protocol	Document	Consider scouring program, including prioritisation of mains to be scoured	4.1	Operational Procedures	Risk assessment	10.03	Mar-2015	Low	Manager Warrumbungle Water; Supervisor Reticulation	24-Apr-20		31-Dec-20	Risk assessments	In progress				Scouring types investigated. Need for scouring to be evaluated. Priority reduced to medium, flushing has resulted improvements. 13/12/19: Due to improvements seen from flushing program, scouring program may not be immediately needed 24/4/20: A number of areas with previous problems, mains have been replaced. With flushing program improvements priority reduced to low. Issue to be discussed at risk	Re-evaluate the need in the risk assessment	
113	Coona barabran	Manganese removal	Investigations	Monitor raw and treated water soluble and total manganese concentrations and determine optimum potassium permanganate dosing ratio and pH.	4.2	Operational Monitoring	CWT report May-15		May-2015	Very High		29-Aug-18				Complete	(Section 4.2.1, p.6/7), total Mn in treated water (0.4 - 0.7 mg/L) exceeds ADWG of 0.1 (many WTP prefer <0.02 to prevent dirty water complaints); additional lab equip. needed: Nalgene hand pump + vacuum flask with filter + 0.2mm filter papers; typical dosing ratio			may need better quality KMnO4; pH will drop with chlorine gas as opposed to NaOCl		
114	Mendoran	Process Control	Investigations	Review of processes controlled by the PLC by a suitably qualified person in conjunction with the PLC programmer to optimise the process and ensure the process functions as designed. Ensure alarms or telemetric functions leaving the plant are reviewed and addressed as a priority so that operators can respond quickly to alarm situations in the plant and so that managers have the capability of monitoring plant performance and trends.	4.2	Operational Monitoring	DPI Inspections	DPI MEN002	Jan-2019	High	Supervisor South	28-Feb-20				Complete				28/2/20: Looked at PLC setup, external text message alarms have been added. Filter backwash function has been corrected in PLC. A number of issues were also rectified in the PLC program. It is apparent that processes controlled by the PLC need to be reviewed to ensure proper plant function. An example of this is the filter backwash function which was allowing incorrect flow rates at drain down and backwash cycles. A suitably qualified person who understands the process needs to work in conjunction with the PLC programmer to optimise the process and		
115	Coona barabran	Performance monitoring	Document / Protocol	Improve WTP record keeping so that major plant changes/issues can be reviewed.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	27-Jun-19				Closed	2018-05: not sure what this is referring to. The operators complete carbon copy books with daily operational data and keep a plant diary that is kept at the plant.			Action closed. Records kept in carbon copy book kept at WTP, including comments.		
116	Coona barabran	Monitoring / Protocol	Document	Develop formal monitoring protocols which identify target criteria for each of the preventive measures being monitored (including CCPs), monitoring records to be kept, responsibilities, authorities and required communication protocols. Combine documented protocols into a formal Operational	4.2	Operational Monitoring			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20		31-Dec-20		In progress				Schedules are captured currently on operational carbon copy books 24/4/20: Consultant has provided proposal to develop operational monitoring plan for all systems	Review proposal to develop monitoring plan	
117	Coona barabran	Documentation / Protocol	Document	Ensure all operational procedures are documented and referenced in the DWMS document register	4.2	Operational Monitoring			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Closed refer to action 334 and 339	Include as part of DWMS review and update (action 334)	
118	Coona barabran	Catchment & Abstraction	Monitoring	Consider turbidity monitoring of infiltration well water and river water on event basis to determine effectiveness of filtration	4.2	Operational Monitoring	Risk assessment	1.02	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Combined raw water testing daily undertaken of current water source (NTU, pH, colour). Raw water quality assurance program in place (micro, chemicals) for all bores as part of NSW Health funding.		

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements	
119	Coonabarabran	Catchment & Abstraction	Monitoring	Consider testing for E. coli in raw water	4.2	Operational Monitoring	Risk assessment	1.04	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented				Raw water quality assurance program in place (micro, chemicals) for all bores as part of NSW Health funding.			
120	Coonabarabran	Catchment & Abstraction	Operation	Monitor raw water organics and nutrient loading.	4.2	Operational Monitoring	CWT report May-15		May-2015	Medium	Technical Officer	24-Apr-20		29-May-20	Interim deadline was 30/9/19 (review RWQ assurance program)	Closed				(Section 4.1, p.6), note: additional treatment processes may be required due to contamination through agricultural activities (farming, fertiliser application).	Raw water quality assurance program in place (micro, chemicals) for all bores as part of NSW Health funding. Combined raw water testing daily undertaken of current water source (NTU, pH, colour). BGA testing during summer period. 13/12/19: Some baseline samples still to be taken (Health officer has since left). RWQ plan still to be reviewed for this requirement 24/4/20: Still to be reviewed and sampling plan developed	Review raw water assurance program against this requirement see items 120, 253, 287, 313)	
121	Coonabarabran	Coagulation & Flocculation	Monitoring	Monitor algae concentrations in the raw water and sedimentation lagoon. Action 248: Operators to re-familiarise themselves with BGA Management Protocols and related response actions. Action 292: Consider additional testing for taste and odour issues (MIB and Geosmin, chlorophyll-a (algae), pH, organic loadings and nutrient levels)	4.2	Operational Monitoring	CWT report May-15		May-2015	Medium	Supervisor Treatment	24-Apr-20		31-Dec-20	was 30/9/19, start testing first week Nov	In progress				(Section 4.2.2, p.10)	BGA testing during summer period in raw water. 27/9/19: will test monthly in lagoons over summer 13/12/19: Have been using PAC. Testing not yet undertaken 24/4/20: Only raw water testing undertaken. Testing of lagoon not yet tested. No taste and odour complaints. PAC being dosed at Coonabarabran. Further investigation into taste issues needed.	Add testing of sedimentation lagoons in warmer months (from December) as per BGA tests in raw water quality monitoring program. To be included in operational monitoring plan. Operators to re-familiarise themselves with BGA Management Protocols and related response actions.	
122	CBN, BDN	Reservoirs	Monitoring	Consider implementing sampling regime for CBN, BDN for chlorine residual in the reservoirs	4.2	Operational Monitoring	Risk assessment	9.02	Mar-2015	Medium	Technical Officer	24-Apr-20		30-May-20	Interim deadline was 13/9/19	In progress				Coonabarabran now (August 2019) recording chlorine residual testing of reservoirs (recorded weekly). 27/9/19: BDN flushing sheet not yet printed (waiting on sheets from Dunedoo) 24/4/20: BDN flushing sheets still to be printed	Baradine monitoring flushing sheet to be amended to include chlorine residual monitoring of reservoirs.		
123	Coonabarabran	Filtration	Minor works	Install a second turbidity meter on the outlet of filter 2.	4.2	Operational Monitoring	CWT report May-15		May-2015	Very High	Supervisor North	27-Jun-19				Closed	2016-10: (Section 4.2.4, p.12 of CWT report) 2018-05: part of S&S funding project 'Automation and Process Instrumentation' - EOI submitted 04/2018	check individual filters periodically - once a week? (AM) may need to install sampling points; put in comments on	Closed, covered by action 130				
124	Coonabarabran	Whole of System	Investigations	Consider online monitoring where CCPs have been identified	4.2	Operational Monitoring	Risk assessment	11.01	Mar-2015	Medium	Manager Warrumbungle Water	28-Feb-20				Closed				Closed, covered by Action 258 and 328.	To be included as part of process monitoring, automation and instrumentation project		
125	Coonabarabran	Filtration	Minor works	Commission the turbidity meter to allow online monitoring of the filters.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Very High	Supervisor Treatment	24-Jul-20	19/20	30-Jun-20		Complete				Part of WTP upgrades 27/9/19: received HH2O quote, need to revise; need PLC replacement (quote R&D) 13/12/19: Have once quote, expecting more quotes in early 2020. HunterH2O to install individual filter analyser (only currently on one filter) 28/2/20: Dual turbidity meters to be installed and replacement of PLC. PLC has been ordered. 24/4/20: Proposal received from HunterH2O for filter upgrade 24/7/20: covered under item 328, will be completed on 28/7/20	Waiting on project timeline for PLC. Liaise with HunterH2O on turbidity analyser.		
126	Coonabarabran	Disinfection	Critical control point	Install continuous online chlorine meter to ensure continual effective disinfection/control of chlorination CCP.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor North	28-Feb-20		31-Jan-20	interim	Closed				Chlorine analyser has been installed, not yet online. Refer to action 258 and 328. Part of WTP upgrades 27/9/19: received HH2O quote, need to revise; need PLC replacement (quote R&D) 13/12/19: Have one quote, expecting more quotes in early 2020. HunterH2O to install individual filter analyser (only	To be included as part of process monitoring, automation and instrumentation project (action 328)		
127	Baradine	Filtration	Minor works	Install online turbidity meters for filtration (AND sedimentation after/during clarifier upgrade).	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor Treatment	24-Apr-20		30-Aug-20		Closed				2018-05: Safe and Secure EOI submitted for 'Automation and Process Instrumentation' . 2019-05: Automation Upgrade scoping study 2018-05: Safe and Secure EOI submitted for 'Automation and Process Instrumentation' . 2019-05: Automation Upgrade scoping study	Location changed to BDN Covered part of automation project (scoping study). 24/4/20: Recent meeting on upgrade project with DPIE, no current resolution. Spare online analyser being considered for use at Baradine at Binnaway. Supervisor to look at online analyser. Hunter H2O are currently doing an automation scoping study that should identify sites where analysers are required. 24/7/20: closed as included in new action A350	To be included as part clarifier upgrade or treatment plant upgrade	
128	Coonabarabran	Filtration	Minor works	Install online turbidity meters for each filter.	4.2	Operational Monitoring	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor North	27-Sep-19		31-Dec-19		Closed				Combined inline online analyser; refer to ID 130	Consider part of automation project (scoping study) or plant of treatment plant upgrade		
129	Mendooran	Disinfection	Minor works	That online turbidity and chlorine residual monitoring is installed at Mendooran WTP.	4.2	Operational Monitoring	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19			Page 12 of 29	Implemented				draft funding deed is in process			

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements	
130	Coona barabran	Filtration works	Minor	Install a second turbidity meter on the outlet of filter 2 and reconfigure the existing turbidity meter to monitor filter 1.	4.2	Operational Monitoring	CWT report May-15		May-2015	Very high	Supervisor Treatment	28-Feb-20		6-Mar-20	interim	Closed	2016-10: (Section 4.2.4, p.13 of CWT report) 2018-05: part of S&S funding application (Incident Review recommendation #)	currently monitoring both filters daily		Covered under automation project (action 328) Part of WTP upgrades 27/9/19: received HH2O quote, need to revise; need PLC replacement (quote R&D) 13/12/19: Have once quote, expecting more quotes in early 2020. HunterH2O to install individual filter analyser (only currently on one filter) 28/2/20: Dual turbidity meters to be installed and replacement	To be included as treatment plant upgrades. Waiting on project timeline for PLC. Liaise with HunterH2O on turbidity analyser.		
131	All	Information / Systems	Document	Develop operating procedures for the following tasks: · Laboratory water quality sampling and testing · Scheduled maintenance tasks · Daily rounds · Plant operations	4.2	Operational Monitoring	Hunter H2O Audit 2014	BAR002, BIN002, BUG001, COH003, COO003, DUN003, KEN001, MEN002	2014	High	Manager Warrumbungle Water	28-Feb-20		31-Dec-19		Closed	No current standard operating procedures exist. General operating procedures are being developed in unison with the alliance			Hunter H2O is developing 12 SOPs (NSW Health support project) 13/12/19: Hunter H2O SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest 28/2/20: Closed as covered by new action 339	To be included as part of action 339 develop SOPs system wide Compile existing SWMS Develop list of required SOPs (including those to be developed by Hunter H2O). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required	Consultant	
132	Mendooran	Minor works	Desludge off line lagoon		4.3	Corrective Action	DPI Inspections	DPI MEN007	Jan-2019	Medium	Supervisor South	27-Aug-19				Complete				Lagoon was desludged			
133	Mendooran	Vegetation Control	Operation	Maintain vegetation control throughout the water plant grounds and particularly around the sedimentation lagoons.	4.3	Corrective Action	DPI Inspections	DPI MEN008	Jan-2019	Medium	Supervisor South	27-Aug-19				Implemented				Vegetation is mowed, weeds pulled. Lagoon weeds removed with excavator when desludge			
134	Binnaway	Sedimentation Ponds	Major works	Reline complete pond to effectively seal the pond to allow effective drying/desludging of the pond. Council is reminded to keep pond cycling times to twelve months to prevent excessive sludge build up which can lead to difficulty in effective drying of sludge. Staff report that ponds have been cycled at twelve month intervals.	4.3	Corrective Action	DPI Inspections	DPI BIN001	Jan-2019	High	Supervisor South	22-Jan-19				Closed				Closed covered by action 330			
135	Mendooran	Reservoirs	Investigations	That WSC investigates the operational control arrangements with a view to including the Standpipe reservoir level as part of the start/stop control of the clear water pumps, so that either the Coolabah reservoirs or Standpipe	4.3	Corrective Action	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete							
136	Mendooran	Reservoirs	Document / Protocol	That WSC review all reservoir inspection reports (2014 and 2017) to develop an Action Plan and urgently implement any outstanding recommendations. This Action Plan information should also be regularly reported back to DPI-Water.	4.3	Corrective Action	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water; Supervisor Treatment	24-Jul-20		31-Aug-20	interim	In progress			Obtaining quotes and confirming contractor		Reservoir upgrades undertaken in May 2019 for integrity. WHS and Internal works still to be undertaken. Captured in annual report in DPIW Circular 18 (Contractor engaged) and in ASAM. 13 December 19: Not yet submitted. 6 reservoirs still to be inspected, difficulties in getting Aqualift to undertake inspection. To get WEARS to undertake inspections/cleans for remaining reservoirs. 28/2/20: Contractor has been engaged to fix remaining 6 reservoirs (WEARS). Circular 18 report has been submitted. 24/7/20; received excel sheet from WEARS incl source reports and priorities (excl 2014 ASAM); for MDN CWT compiled a list incl. 2014 ASAM reports but no prioritisation -->	Liaise with WEARS to provide quote on updated list.	

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137	Mendooran		Document	That WSC review the LMWUA Water Treatment Plant Audit Report for the Mendooran WTP (September 2014), develop an Action Plan and urgently implement any outstanding recommendations. This Action Plan information should also be regularly reported back to DPI-Water.	4.3	Corrective Action	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented							
138	Coonabarabran		Document / Protocol	Establish a rapid communication system to deal with unexpected events.	4.3	Corrective Action			Mar-2015	High	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed				Draft ERP Hunter H2O developing updated incident response plan (NSW Health project)	To be included as part of ERP update (action 341)	Consultant (NSW Health)	
139	Coonabarabran		Training	Train relevant staff in these procedures (rapid communication incident response) and maintain a record of training. (A139)	4.3	Corrective Action			Mar-2015	High	Manager Warrumbungle Water	24-Jul-20			Within 2 months of finalisation	Closed				Training once new plans are developed 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H2O NSW Health project. 20/2/20- Training to be developed following development of ERP (Action 341)	As part of HH2O IRP project (see action 341)		
140	BUG, DUN, KEN	Environmental	Minor works	Install an appropriate containment bund around the dosing tank to capture any chemical leaks or spills during pump operation or transfer of hypo	4.3	Corrective Action	Hunter H2O Audit 2014	BUG006, DUN009, KEN006	2014	Medium	Supervisor Treatment	24-Apr-20		30/05/2020		In progress				There is no chemical bund in the chlorine dosing/bore room. Chemical leaks and spills will not be contained and increases the risk of release to the	Dunedoo - 19/20 FY chlorine upgrade to gas 27/9/19: BUG/KBI: 200L mix tanks (diluted 20:1, 10:1 in summer with 20L 13% drums) 24/4/20: DUN moving to chlorine gas.	Purchase bunding for tanks (BUG, KEN)	
141	Coonabarabran	PAC dosing	Minor works	Replace the dosing lines and check the operation of the unit. Cover or store the unit in an area that reduces the chance of damage and systematically test its operation to ensure it remains functional.	4.3	Corrective Action	Hunter H2O Audit 2014	COO011	2014	Medium	Supervisor North	27-Aug-19				Complete				The current portable dosing skid is outside and the condition is deteriorating. The unit will require some refurbishment work before it	Has been recently moved closer to the wall. Currently in use (for algae in the lagoon) for taste and odour.		
142	Coonabarabran	Filtration	Investigations	Determine the filter media height and compare against the design levels Sample the filter media and test for sludge content Continue to monitor filter media height to determine if there is any filter media loss Perform a sludge content analysis of the filter media. Investigate the condition of the air scour and filter underdrain pipework to determine the root cause of the issue	4.3	Corrective Action	Hunter H2O Audit 2014	BAR006, COO007	2014	Medium	Supervisor North	30-Jul-19	22/01/2019				Closed				Filter media levels are currently unknown and media loss is apparent inside the filter	Complete as part of filter inspection. Filter media to be replaced by end of FY. Closed as covered by other action (77 and 150)	
143	Coonabarabran	Sludge handling	Investigations	Have sludge tested prior to disposal to ensure it complies with legal requirements for disposal (waste classification guideline). The sludge should be tested for metals, organics, pH and moisture content	4.3	Corrective Action	Hunter H2O Audit 2014	BAR007, BIN007, COO008	2014	High	Technical Officer	30-Jul-19		30/09/2019		Closed	Sludge is excavated from the sedimentation ponds and disposed of at the local tip as required. No testing of the				Investigated biosolids requirements and do not take samples prior to disposing to landfill		
144	Mendooran	Sludge handling	Investigations	Sample and test the sludge prior to removing from the lagoon to ensure it is appropriate to apply/dispose on site. The sludge should be tested for metals, organics, pH and moisture content	4.3	Corrective Action	Hunter H2O Audit 2014	MEN008	2014	High	Supervisor South	27-Jun-19				Closed					sludge disposed of off-site		
145	Coonabarabran		Document / Protocol	Continue developing the existing asset registers to develop an electronic database that includes details such as; age of infrastructure; expected life; last service date; maintenance frequency; manufacturer; recorded failures; responsibility for maintenance; operational procedures; and records for maintenance of equipment (including calibration). This should include any	4.4	Equipment Capability & Maintenance			Sep-2016	Low	Manager Warrumbungle Water	24-Apr-20		31-Dec-20		In progress					5 yearly evaluation of asset evaluations (last FY16/17) 24/4/20: Asset register is updated annually following completed capital projects.	Asset management plan & registers to be developed. Discuss with Leanne (Director Environmental Services)	
146	Coonabarabran	Filtration	Investigations	Review current filter bed depth against design depth and consider increasing media layers for better size to depth ratio.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low	Supervisor Treatment	24-Apr-20		31-Dec-20		In progress			(Section 4.2.4, p.13)	Filter inspection undertaken. 24/4/20: Quote received from Hunter H2O for filter media replacement.	To be included as part of filter media replacement		
147	Mendooran	Disinfection	Investigations	Consider insulating the chemical storage shed to lesson chlorine degradation.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low	Project Engineer	24-Apr-20		30-Sep-20	Interim (finish concept design)	Closed	(Section 4.2.5, p.16)				24/4/20 To be upgraded to gas Action closed, as now covered into new combined Action 345		
148	Coonabarabran	Organic Removal (catch)	Investigations	Consider planting vegetation in/around Timor Dam to absorb organic contaminants used by algae for growth.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low		27-Aug-19				Closed			(Section 4.1, p.6)	Vegetation surrounding dam currently. Mixer installed.			
149	Coonabarabran	Fluoridation	Investigations	Analyse scale forming in fluoride system and on dosing spear.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Low	Manager Warrumbungle Water	24-Apr-20		31-Dec-19		Closed			(Section 4.2.6, p.16)	24/4/20: Closed, included under Action 346	Close ADD fluoridation		
150	Coonabarabran	Filtration	Investigations	Optimise filtration by investigating BW flow rate and BW water quality.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Very high	Supervisor North	13-Dec-19	19/20	31-Jan-20	Interim	Closed	2016-10: Filter performance is poor, carry-over of filter media, BW rate likely to be too high + BW duration may be too long; 2018-05: optimisation of manual backwash was performed by staff. Filter media replacement scheduled starting 25/06/18. Safe and Secure EOI for 'Automation and			Filter inspection has been undertaken (FY18/19). Media replacement scheduled for FY19/20. Also refer to ID 91 13 December 2013: Issue with bypass was identified and rectified which has improved BW flow rates. To confer with HunterH2O if filter replacement is still necessary.			

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151	Mendooran	Distribution	Major works	Replace service water pumps Install appropriate back flow prevention vales Run a service water line across to the laboratory to test treated water	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI MEN003	Jan-2019	Medium	Supervisor South	27-Aug-19				Closed	The service water system at the water plant has not been functioning correctly since construction. The service water pumps need to be replaced with correctly sized pumps to supply water to the chemical dosing boards and safety showers. Operators have noted previously an incident where sodium hypochlorite has backflowed into the			Alternative arrangements have been undertaken to address the reasons for the requirement		
152	Mendooran	Reservoirs	Major works	A recirculation/rechlorination system should be considered to maintain a set concentration of free chlorine throughout the reservoirs. Vermin/bird proofing to be made permanent, access covers bought up to standard, overflow pipes made vermin proof Clean up of the site to remove cut vegetation is required as well as trimming back overhanging trees if needed. (A152)	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI MEN004	Jan-2019	High	Supervisor Treatment; Project Engineer; Manager Warrumbungle Water	24-Jul-20		31-Oct-19	Interim deadline (engage consultant for concept design)	Closed	proofing needs to be made permanent, foam fill is a temporary measure that has already been compromised leaving the reservoir susceptible. Access covers should be brought to standard by ensuring they are sealed to the roof to prevent stormwater ingress, have a 100mm riser and a lockable lid. Overflow pipes should be		Vermin/bird proofing - complete (May 2019) Site has been cleaned up and overhanging trees have been trimmed. 27/9/19: tender accepted as per Sept Council meeting, letter of offer prepared: future funding for D&C doubtful 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 20/2/20: To report to Council on choice of contractor 24/7/20: closed as included in ation A345	Recirculation to be covered by Mendooran Plant upgrade project (currently out for tender) Interim - report to Council on choice of contractor Find funding following concept design finalisation (liaise with DPIE)		
153	Mendooran	Reservoirs	Major works	Consider replacing the roof with a platform roof. This would have several advantages, the whole roof becomes the access platform with surrounding handrail (removing some of the roof inspection concerns i.e. working at heights on a pitched roof). Access hatches installed to standard and remove pitched roof. Council should indicate how they intend to meet Circular 18 (issued by DOI Water) requirements for reservoir maintenance and inspections. Council should consider either a recirculation/rechlorination system to maintain the chlorine level at a set point in this reservoir or install a mixer to destratify the reservoir. It is understood Council is considering pressure booster pumps to address previously noted water pressure issues from this reservoir.	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI MEN005	Jan-2019	High	Supervisor South; Manager Warrumbungle Water	28-Feb-20		28-Feb-20	submit C18 report	Complete	An attempt has been made to seal the hatch lid on the stand pipe reservoir but the reservoir has not been sealed to prevent stormwater ingress. In it's current form it would be very difficult to seal effectively due to the way the roof and platform have been constructed. As recommended previously, Council should		Circular 18 (Contractor engaged to develop. Hatches have been replaced. Tender to be prepared to undertake external concrete repairs. 28/2/20: Circular 18 submitted January 2020. Closed, refer to other action 152 for consideration of recirculation/rechlorination system	Recirculation to be covered by Mendooran Plant upgrade project (currently out for tender) Interim - report to Council on choice of contractor; refer to ID 152		
154	Bin	Laboratory	Major works	Consider a transportable building to provide adequate laboratory space with storage cupboards and lab sinks to facilitate daily testing. This would be an opportunity to include updated staff amenities in the new building such as toilet, shower, and lunch room as well as provide a space for administration/record keeping i.e. desk and computer with internet access. Given the current water quality issues of iron and manganese it is recommended that Council provide test equipment in the laboratory that is capable of testing for those parameters.	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN002	Jan-2019	Low	Supervisor South	27-Aug-19				Closed	The current laboratory space is inadequate for housing the necessary laboratory equipment to carry out the			Required daily testing is being carried out. Additional building not considered necessary at this stage.		

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155	Binnaway	Distribution	Minor works	Repair/replace high lift pump	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN003	Jan-2019	High	Supervisor South	27-Aug-19				Complete						Pump has been replaced (August 2019)		
156	Binnaway	Filtration	Minor works	Replace filter outlet valve	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN004	Jan-2019	High	Supervisor South	27-Aug-19				Closed						The filter outlet valve has not been effectively shutting off and the replacement valve has been on site for some time. This valve should be replaced as soon as possible.	Closed as covered by action 327	
157	Coonabarabran	Filtration	Investigations	Consider need to replace filter media.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Medium		25-Jun-18				Complete						2016-10: Underdrains may also need refurbishment 2018-05: Replacement scheduled to start 25/06/18. 2019-05: replacement completed as		
158	Binnaway	Sedimentation Lagoons	Operations	Ensure the desludging of the sedimentation lagoons and any necessary maintenance is carried out at the earliest opportunity to ensure the offline lagoon is available for service when required.	4.4	Equipment Capability and Maintenance	DPI Inspections	DPI BIN007	Jan-2019	High	Supervisor South	27-Aug-19				Complete						The offline sedimentation lagoon has recently been brought online. Staff have indicated that the lagoon currently offline will now be pumped out to allow the lagoon to dry	Desludging has been completed, undertaken on an annual basis.	
159	Check location - BUG, KEN, DUN	Disinfection	Minor works	Install duty/standby chlorine dosing pumps.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Medium	Supervisor North; Supervisor South	27-Aug-19				Closed	2018-05: Note - spare pumps are available					Spare pumps considered adequate for sites, duty/stand by not considered necessary due to site size and intended upgrades (DUN).		
160	Mendooran	Investigations	Operations	That WSC liaises with DPI-Water to prepare a program of capital works required to address current water treatment plant and water supply issues identified in this report, with the aim of obtaining funding under the "Safe &	4.4	Equipment Capability and Maintenance	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	22-Jan-19				Complete								
161	Coonabarabran	Fluoridation	Investigations	Discuss fluoridation issues with PHU/DPI Water.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Very high		29-Aug-18				Complete	2016-10: Unknown solid in saturator of significant volume; dosing pump turned up to 100% to try and maintain final concentration (still underdosing); resolved by adding new fluoride to saturator (unknown substance still present) --> analyse solid to determine if it originates from a reaction with the source water. 2018-05: Removal of solid and					communicated to public that we are not dosing fluoride wait to hear back from NSW Health Water Unit following email from		
162	Mendooran	Coagulation & Flocculation	Operations	Remove algae from flocculator chamber and aerator surface.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water; Supervisor Treatment	24-Apr-20		31-Mar-20	confirm with HH2O	Complete							Cleaned on an annual basis (lagoon changeover) 13/12/19: Confirmed that maintenance schedules is to be undertaken as part of Hunter H2O NSW Health project (Task 4) 24/4/20: Included as a maintenance item	
163	Coonabarabran	Organic Removal (catch)	Investigations	Check mixing profile of the WEARS mixer in Timor Dam.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium		30-Jul-19				Closed						(Section 4.1, p.6)	No longer required, mixer is working fine (previously upgraded)	
164	Coonabarabran	Organic Removal	Major works	Upgrade existing PAC system with a new automated batching and dosing system.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Supervisor North	27-Sep-19		30-Apr-20		Closed						(Section 4.2.1.1, p.8)	27/9/19: not required, dosing is adequate (batching); replaced pump recently	Investigate the need for upgrading the PAC dosing system, as part of treatment plant upgrade
165	Coonabarabran	Disinfection	Minor works	Install scales for chlorine gas cylinders and connect to SCADA.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Supervisor Treatment	24-Apr-20		31-Mar-20		Complete						(Section 4.2.5, p.15)	Scales are installed, not connected to SCADA 24/4/20: Marked as complete, scale installed. Connection to SCADA included as part of action 328)	
166	Coonabarabran	Fluoridation	Operations	Check service water for fluoride system is within required quality limits and softener is working effectively.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water	24-Apr-20		30-Jun-20		Closed						(Section 4.2.6, p.16)	24/4/20: Within HunterH2O project. Project is progressing. Closed, included under Action 346. Change to LOW	To be included as part of task 4 Hunter H2O NSW Health project

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167	Coona barabran	Fluoridation works	Minor	Modify fluoride saturator outlet pipework.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Medium	Manager Warrumbungle Water	24-Apr-20		30-Jun-20		Closed		(Section 4.2.6, p.16)		24/4/20: Within HunterH2O project. Project is progressing. Closed, included under Action 346. Change to LOW	To be included as part of task 4 Hunter H2O NSW Health project		
168	BAR, BIN, CBN, MDN	Filtration	Operations	Consider maintenance program for the filters	4.4	Equipment Capability & Maintenance	Risk assessment	5.01	Mar-2015	Medium	Manager Warrumbungle Water	24-Apr-20		31-Mar-20	confirm with HH2O	Closed				13/12/19: Confirmed that maintenance schedules is to be undertaken as part of Hunter H2O NSW Health project (Task 4)	To be included as part of task 4 Hunter H2O NSW Health project	Consultant (NSW Health)	
169	BAR, BIN, CBN, MDN	Filtration	Investigations	Consider online turbidity meter with interlocks at BWY, BDN Consider interlocks for meters at CBN and MDN	4.4	Equipment Capability & Maintenance	Risk assessment	5.01	Mar-2015	Medium	Manager Warrumbungle Water	28-Feb-20				Closed				Closed, as part of automation project (action 328)	To be included as part of process monitoring, automation and instrumentation project		
170	All	Disinfection	Operations	Consider program of analyser calibration	4.4	Equipment Capability & Maintenance	Risk assessment	7.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Closed					Closed, covered by action 191		
171	Mendooran	Disinfection	Investigations	Investigate installation of chlorine mixer for batching or replacement with chlorine gas	4.4	Equipment Capability & Maintenance	Risk assessment	7.01	Mar-2015	Medium	Supervisor Treatment	24-Apr-20		30-Sep-20	Interim (finish concept design)	Closed				24/4/20 To be upgraded to gas	Action closed, as now covered into new combined Action 345	Part of Mendooran upgrade project (A345) Confirm current mixing	
172	Mendooran	Documentation / Protocol	Investigations	That WSC investigate and implement a formalised preventative maintenance program for all the WTP, reticulation and reservoir assets.	4.4	Equipment Capability and Maintenance	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water; Supervisor North; Supervisor South	24-Apr-20			Following H2O project to develop schedules	Closed		NSW Health has advised their intention to engage a consultant to develop a WTP Maintenance		Maintenance schedules to be developed for WTP by Hunter H2O (NSW Health project). 24/4/20: HunterH2O project only looking at treatment. Action closed and includes as part of action 340	Preventative maintenance program to be formalised for reticulation and reservoir.		
173	Binnaway	Fluoridation works	Minor	Arrange for cleaning of fluoride saturator (considering hazardous nature of material).	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Very high	Manager	24-Apr-20		31-Mar-20	wait for HH2O	Closed	2018-05: Being arranged for by LMWUA			Covered by action 332 (NSW Health project) 13/12/19: HunterH2O project (Task 4a) 80% complete, waiting for approval from DPIE to complete works 28/2/20: Internal meeting today with Health on design. Scheduled a workshop in March to present design	To be included as part of action 332 (replace fluoridation systems)	Consultant (NSW Health)	
174	BAR, CBN, MDN	Reservoirs	Investigations	Consider investigating the status of other reservoirs (MDN, BDN, CBN)	4.4	Equipment Capability & Maintenance	Risk assessment	9.02	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Closed as covered by actions action 63, 66, 136			
175	All	Distribution	Major works	Replace old water meters with new water meters including backflow prevention devices	4.4	Equipment Capability & Maintenance	Risk assessment	10.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Implemented					Program of replacement of water meters in place (1/3 to be completed FY19/20)		
176	Baradine	Clarification works	Major	Replace the clarifier.	4.4	Equipment Capability & Maintenance	Bligh Tanner report Feb-16		Feb-2016	Medium		27-Aug-19				Closed		2018-05: Safe and Secure EOI approved for 'Baradine WTP Upgrade'. 2019-05: SSWP funding granted		Approval for funding for clarifier. Waiting for s60 endorsement and funding endorsement by DoI Water. Closed, covered by action 192			
177	Mendooran	Reservoirs	Minor works	That WSC investigates the installation of an inline booster pumping station on the outlet of the Standpipe reservoir to provide sufficient water pressure for a regular watermain flushing program to be implemented, to improve the water supply system's firefighting capacity and reduce overall water age by only storing water volumes sufficient to meet peak day demands.	4.4	Equipment Capability and Maintenance	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Implemented				Included in S&S funding (R1)			
178	Mendooran	Mangroves removal	Minor works	Re-configure potassium permanganate dosing arrangement to allow 5 min contact with raw water prior to addition of PACl.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Very High	Manager Warrumbungle Water	24-Apr-20		30-Sep-20	Interim (finish concept design)	Closed	2016-10: (Section 4.2.1, p.8/9); currently dosing points not separated, suggestions: move KMnO4 to raw water pumping station OR install 5000L oxidation tank above aerator (cascades) 2018-05: part of S&S funding application (Incident Review recommendation #)			Covered under Mendooran upgrade project. Currently out for tender. First stage is a scoping study (ID 48). Could be covered under the raw water blend tank from left over funding 13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 28/2/20: Have provided a report. Project manager has been engaged to review the documents. Have engaged with DPIE on funding options. Have not yet been advised if funding has been allocated.			
179	Mendooran	Disinfection works	Minor	Provide increased pumping capacity for chlorine dosing for disinfection.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	High	Supervisor South	27-Jun-19				Closed	2016-10: (Section 4.2.5, p.16 of CWT report), dosing system (provide 5 mg/L @ 5%) not designed for diminishing chlorine strength -> pump max rate reached			No longer an issue (following regular cleaning of pipes)			
180	Coona barabran	Filtration	Investigations	Inspect the filter media and compare to design details (top up where necessary).	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	High	Supervisor North	27-Jun-19		31-Oct-19		Complete	2016-10: (Section 4.2.4, p.13 of CWT report)			Inspection complete			
181	Coona barabran	Disinfection works	Minor	Install standby rotameter and eductor for chlorine dosing system.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	High	Supervisor North	27-Jun-19				Complete	2016-10: (Section 4.2.5, p.15 of CWT report)			Chlorine room has been upgraded (April 2019)			
182	Binnaway	Filtration	Investigations	Check filter media depth against design requirements	4.4	Equipment Capability & Maintenance	Risk assessment	5.01	Mar-2015	High	Manager Warrumbungle Water; Supervisor	27-Jun-19				Complete				Filter inspection undertaken (2017) and filter media replaced (June 2018)			
183	Dunedoo	Reservoirs	Minor works	Bullindah reservoir roof replacement (currently planned)	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	27-Jun-19				Complete				Replaced late 2015 Entry hatch replaced, sealing works (May 2019)			
184	Mendooran	Reservoirs	Minor works	Coolabah requires vermin proofing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	27-Jun-19				Complete				Complete May 2019			
185	Coolah	Reservoirs	Minor works	Wentworth Ave and Martin St Reservoirs requires vermin proofing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	30-Jul-19		15-Sep-19	complete 27/9/19	Complete				Martin St has been vermin proofed Wentworth Ave needs investigation (e.g. overflow)			
186	Coolah	Reservoirs	Minor works	Wentworth Ave Reservoir requires sealing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Manager Warrumbungle Water	24-Apr-20		30-Jun-20		Complete				28/2/20 - Wentworth Ave has been sealed, one spot still to be fixed (WEARS are coming back to be fixed) 24/4/20: Area has been backfilled.	Project management resource sought		
187	Baradine	Reservoirs	Minor works	Clear water tank requires vermin proofing	4.4	Equipment Capability & Maintenance	Risk assessment	9.01	Mar-2015	High	Supervisor South	27-Jun-19				Complete				CWT has been sealed			

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements
188	BUG, DUN, MDN	Information Systems	Document / Protocol	Develop a list of equipment for the site and obtain operation and maintenance manuals from equipment suppliers. Store manuals on site	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BUG004, DUN006, MEN004	2014	Medium	Supervisor North; Supervisor South	30-Jul-19	22/01/2019			Closed				Closed covered by action 340	To be included as part of action 340 (development of WTP maintenance schedules)	
189	Binnoway	Filtration	Operations	Ensure DP cells are functional and reading correctly. Modify PLC code to allow filter backwashes to be initiated by either filter run time, filter headloss or filtered water turbidity	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BIN006	2014	Medium	Supervisor Treatment	24-Apr-20		31/12/2020		In progress				24/4/20: PLC upgrades in budget for next financial year. Can add headloss, this will require metering.	To be included as part of treatment plant upgrade & PLC upgrade	
190	BAR, BIN, BUG, CLH, DUN, KEN	Information Systems	Document / Protocol	Identify critical equipment and develop procedures to maintain, repair and replace equipment as necessary	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BAR003, BIN003, BUG003, COH005, DUN005, KEN03	2014	Medium	Manager Warrumbungle Water; Supervisor Treatment	24-Apr-20		1/01/2021	interim (list of spares Supervisor maintenance schedules (HH2O timeline))	In progress	No current asset maintenance plan exists.			NSW Health project to include operation and maintenance schedules at WTPs. No asset management plan. 13/12/2019: To complete a criticality assessment, North is known (but not formalised) 28/2/20: Director Technical Services and Director Corporate and community Services are responsible for the asset management plan. Not yet looked at water. Current spares are known informally. Priority reduced to medium, as this is a matter of formalising what is known. 24/4/20: Critical spare list in development. All sites have whiteboards, with daily, monthly, yearly maintenance. Are	Identify current spares / replacement equipment at each site (Treatment Supervisor). Clarify asset management plan progress / status (Manager) Confirm timeline for schedules (Manager) Criticality assessment (to identify critical spares)	Consultant; Project Management resourced needed
191	BAR, BWY, CLH	Laboratory equipment	Operations	Perform appropriate scheduled maintenance and calibration of lab equipment according to the equipment manufacturer/supplier's recommendations	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BAR013, COO014, BIN011	2014	High	Supervisor Treatment; Technical officer	24-Jul-20		30/04/2020	To undertake calibrations	Implemented	Minimal or no maintenance is carried out by the operators			Annual maintenance and calibration is being carried of instruments and lab equipment, undertaken by contractors (last done in May - due to be completed) 27/9/19: AM had sent new bores equipment to SS but still need model numbers; SS to liaise with supervisors to that list for quotes can be compiled (excluding equipment that we calibrate ourselves) 13/12/19: Quote has been received, Partial list has been compiled. SS to add remaining locations and check with Supervisors 28/2/20: Internal board set up at CBN of frequency of maintenance and calibrations for operators to undertake and sign off on. To be set up at all sites. Photos to be taken	Take photos (Supervisor) of calibration and maintenance boards and setup folder for photos for InfoXpert, e.g. "Instrument and equipment maintenance" under DWMS (Tech Officer) --> will go Jacinta's task list	
192	Baradine	Clarification		The council is in the process of engaging contractors to identify and implement an appropriate repair or upgrade	4.4	Equipment Capability and Maintenance	Hunter H2O Audit 2014	BAR005	2014	High	Manager Warrumbungle Water	24-Jul-20	19/20	30/06/2020		Closed	The clarifier is showing signs of deterioration and the wall thickness at various points is low due to corrosion.			Approval for funding for clarifier. Waiting for s60 endorsement and funding endorsement by DoI Water. 13/12/19: Dependent on outcomes of review of need for plant upgrade/replacement 28/2/20: See action 78 & 68		
193	Mendooran	Manganese removal	Operations	Begin dosing chlorine into the filters, targeting a residual of 0.1 mg/L in the filtered water outlet.	4.4	Equipment Capability & Maintenance	CWT report May-15		May-2015	Very High		29-Aug-18				Closed	(Section 4.2.4, p.15), multi-barrier approach to removing Mn (aim: keep MnO2 coating in oxidised state on filter media, prevent reduction back to soluble form)	Not required: WTP ops under control with regular jar testing + correct dosing rates; Fe/Mn	check filter inspection report from 2018			
194	Coonabarabran	pH correction (pre-coagulation)	Investigation	Investigate the need for raw water softening and possible alternate chemicals for pH correction.	4.5	Materials & Chemicals	CWT report May-15		May-2015	Low	Supervisor Treatment	24-Apr-20		30-Sep-20	interim	Not started	2016-10: (Section 4.2.1.2, p.10 of CWT report)			27/9/19: meanwhile bore water in use, which is very soft; however most dosing problems overcome (maintenance, different pumps); investigate changing to soda ash from lime (lime cheaper but soda ash dissolves in water); changed priority to LOW	Check CWT for action details; get costs for soda ash to compare + investigate cost/requirements for	
195	Mendooran	Disinfection	Operations	Commence regular chlorine batch concentration monitoring.	4.5	Materials & Chemicals	CWT report May-15		May-2015	Very High	Supervisor Treatment	24-Jul-20		31-Aug-20		In progress	(Section 4.2.5, p.16 of CWT report) 2018-05: Operator requires on-site training; Supervisor South; SS do drop tests with Stephen Drew (do each time when dose rate is changed, e.g. when swap river/bore water; min weekly)	should test what we receive + do drop test on pump + check PLC; need updated operational sheet; check PLC settings	Operators are testing when chemicals received. 27/9/19: GR to notify SD + verify that there is room in log book (SS) 13/12/19: Investigating equipment to test batch chlorine 28/2/20: Still to be investigated, procedure to be developed and staff to be trained. Long term to be replaced by gas. 24/7/20: HH2O sent through an easy procedure, however implementation/operator training outstanding [result will be put in comments section on spreadsheet]; to be done weekly	Procedure to be formalised (including space for test to be recorded and frequency)		
196	All	Documentation		Confirm whether Council's supplier contracts include chemical quality compliance.	4.5	Materials & Chemicals			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20		30-Jun-20		In progress				13/12/19: Contracts to be investigate 24/4/20: Have sent request for contract, have not yet heard	Contact appropriate person to get a copy of	
197	All	Documentation		Develop a program to undertake spot checks for chemical quality compliance.	4.5	Materials & Chemicals			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Not considered to be required due to use of reputable and operator monitoring. Issues investigated as required.		
198	All	Disinfection	Investigation	Consider testing of hypochlorite strength	4.5	Materials & Chemicals	Risk assessment	7.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Undertaken at Mendooran. Chlorine analyser to be installed, no longer necessary at other sites.		
200	Mendooran	Distribution	Operations	Operators should be filling out the plant record sheets. Where equipment is not working or requires replacement/repair, this should be done as a matter of priority. This includes the following: 1. pH meter, 2. pH buffers, 3. Chlorine test reagents, 4. On line raw water turbidity meter.	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI MEN010	Jan-2019	High	Supervisor South	27-Aug-19				Implemented				The current level of plant performance recording at the plant is	Plant records are now being filled out. Supervisor and Technical Officer review that sheets are completed.	

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements
201	Binnaway	Iron and manganese issues	Operations	Reconfigure the chlorine dosing to allow for the installation of a calibration tube to facilitate the measurement and recording of chlorine dosages. The operator would also need to calculate hypochlorite strength in order to calculate the chlorine dosage.	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI BIN006	Jan-2019	High	Supervisor South	27-Aug-19				Complete		manganese treatment was discussed with the staff. Staff were requested to keep this office informed of progress with iron and		Dosing was reconfigured, for iron and manganese issues (early 2019)		
202	Binnaway	Disinfection	Minor works	Install a larger calibration tube to allow for the volumes required over a three minute test (based on current dose rates). It is estimated that a five hundred or thousand millilitre calibration tube would be appropriate. Whilst the current calibration tube allows for a very quick snapshot of dose rates a larger tube would facilitate more accurate setting of dose rates and data recording.	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI BIN008	Jan-2019	Medium	Supervisor Treatment	24-Apr-20		30-May-20	had no due date	Not started		carried out to check the alum dosage. The calibration tube should be sized to allow for three minute drop tests to facilitate accuracy of measurement.		27-9-19: GR to order equipment as required (SS can help if required) 24/4/20: Equipment still to be ordered	Equipment to be ordered and installed	
203	Binnaway	Distribution	Minor works	Ensure that staff have the necessary testing equipment available on site to test for aluminium to ensure the process is maintaining aluminium residuals within drinking water guideline levels. W	5.1	Drinking Water Quality Monitoring	DPI Inspections	DPI BIN009	Jan-2019	High	Technical officer	13-Dec-19		4-Oct-19	Interim was 13/09/19	Complete		testing was carried out in Binnaway with the following results: The pH was noted as being slightly high in the sedimentation lagoon. A pH range of between 6 and 7 is expected with alum dosing. If there is no aluminium carry over from the settlement process then the higher pH is of no concern, however if aluminium carry over is detected this is		Equipment has capability to test for aluminium. Reagents not currently available on site. 27/9/19: assess what is required for testing and/or order reagents from HACH next week (check lab test equipment manual) 13/12/19: Reagents have been delivered. Operators to review SOP.	Ensure necessary reagents are available and operators are trained (to SOP)	
204	Mendooran	Operations	Operations	A new sampling site be created for the correct monitoring locations in Bandulla street. Sample site 123 (57 Bandulla Street) can then be archived.	5.1	Drinking Water Quality Monitoring	Mendooran Boil Water	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete						
205	ALL	Documentation / Protocol	Documentation	That WSC develop and implement a "Drinking Water Quality Monitoring Plan" which formalise staffrole responsibilities, authorities reporting and communication protocols and review existing procedures for sampling and testing. The monitoring plan should be built based on the NSW Health Drinking Monitoring Plan (available on the NSW Health website).	5.1	Drinking Water Quality Monitoring	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	24-Jul-20		31-Jan-21		In progress		DWQ Monitoring Plan		13/12/19: Consultant has provided a proposal to develop verification proposal 24/7/20: dependant on 205	To follow on from action 206 Engage consultant to develop verification monitoring plan	Consultant
206	All	Documentation / Protocol	Documentation	Formally document all drinking water quality monitoring protocols and combine into a formal Water Quality Verification Plan.	5.1	Drinking Water Quality Monitoring			Mar-2015	High	Technical Officer	24-Jul-20		31-Oct-20	Interim (was 31/10/19)	In progress			Information for plan is in process of being collected. 27/9/19: info needs to go on T-drive; some photos still need to be taken; sample sites require updating (+photos added) + incident flowcharts added 13/12/19: Proposal from consultant to develop verification proposal 28/2/20: No progress 24/7/20: Jacinta Green (consultant) to address - CW needs to engage, meanwhile WQ monitoring protocol to be updated	Develop draft Water Quality Verification Plan with site locations (and photos). Investigate changing site numbers in NSW Health database. Engage consultant to develop verification	Consultant	
207	BAR, BIN, CLH	Fluoridation Systems	Operations	Confirm process on extracting data from NSW Health Water Quality Database	5.1	Drinking Water Quality Monitoring	Risk assessment	8.01	Mar-2015	High	Technical officer	30-Jul-19				Implemented				Data is downloaded from database and uploaded onto Councils website on a monthly basis by the Technical Officer		
208	Mendooran	WTP	Operations	Perform jar tests to determine optimum coagulant dose rates and mixing configurations. Investigate (by performing jar tests) using separated dosing diffusers for improved efficiency of both coagulation and metal removal	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	MEN006	2014	Medium	Supervisor South	27-Aug-19				Implemented		Poly aluminium chloride and potassium permanganate are both dosed through the same diffuser into the top of the aeration stairway		Currently undertaking jar tests. Draft jar testing SOP has been developed. Jar testing training to be undertaken at Coonabarabran (September 2019)		
209	BAR, BIN, CLH	Information Systems	Operations	Enter data at the plant on a daily basis. This will require a local pc with network connection. Data to be used for the following purposes: · Alarms generated if measured values are outside of required parameters (this includes water quality and chemical stock levels) · Monitor chemical dose rates and usage and compare to plant performance and water quality to identify potential efficiency improvements	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BAR001, BIN001, COO002	2014	High	Supervisor North; Supervisor South	28-Feb-20				Closed	Daily data sheets are stored electronically at the shire office. Therefore the following is not possible: · Fast and easy access to historical results · Ability to use collected information for efficiency improvements		Data entered electronically. Closed as covered by automation project (action 328).	To be included as part of process monitoring, automation and instrumentation project (action 328)		

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements	
210	Coolah	Information Systems	Operations	Implement routine monitoring of daily and instantaneous chlorine gas usage and plant flow rates. Perform calculations to determine instantaneous and daily chlorine dose rate. Installing scales for the chlorine cylinders to stand on will allow for daily chlorine usage to be measured.	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	COH004	2014	High	Supervisor Treatment; Technical officer	24-Jul-20		31/12/2020	Interim (update record sheets)	In progress	Chlorine gas and treated water instantaneous flow rate measurements are not being recorded when operators are onsite. Measuring and monitoring of instantaneous chlorine dose rate and plant flow can provide confirmation of			Scales have been installed. Daily monitoring in reticulation. 28/2/20: Flow is being recorded when operators are onsite (has been for some time). Coolah flow is not variable unless change bore source (diff pump). 24/7/20: to be included in next update of carbon copy books,	Bottle weights to be recorded on sheet and calculation added. Supervisor and Tech Officer to review and update sheet.		
211	Mendooran	Iron and manganese issues	Operations	Perform jar testing to determine optimum manganese removal dosing configurations	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	MEN009	2014	High	Supervisor South	27-Jun-19				Implemented	The plant experiences high manganese levels			Implemented from December 2017			
212	Binnaway	Online monitoring	Critical control point	Consider implementing online monitoring of critical water quality parameters including · Raw water pH · Raw water turbidity · Filtered water turbidity · Treated chlorine residual	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BIN010	2014	High	Supervisor South; Project Engineer; Manager Warrumbungle Water	28-Feb-20		30/03/2020	had no due date	Closed	Currently no online monitoring exists of the process. Issues with pH changes during weather events have historically caused operational issues			Funding granted from Safe and Secure for scoping study of automation. Action progressed under action 328 Have received quotes for online monitoring of chlorine; 27/9/10: GR consider online NTU meter (filtered water) for now - check with what CBN is getting 13/12/19: Will need a new PLC to purchase/install online analysers	To be included as part of process monitoring, automation and instrumentation project (action 328) Receive audit report from consultant		
213	Coonabarabran	Process monitoring	Operations	Record and monitor 24-hr chemical usage and plant flow. This data will highlight plant performance and assist in identifying trends and possible dosing issues.	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	COO013	2014	High	Technical Officer	13-Dec-19		31/01/2020		Complete	24 hour chemical usage verse flow calculations are not performed			27/9/19: can be done before 30/09 13/12/19: Calculation still to be added. 28/2/20: Calculation to be added			
214	BUGKEN	Routine testing	Monitoring	Initiate daily sampling and testing of the town distribution system. Tests should include free chlorine residual, pH and turbidity. This will improve response times to water quality issues. Data collected can also be used for future planning and adjustments to the daily operating set points.	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	BUG005, KEN005	2014	High	Supervisor Treatment	24-Jul-20		31/10/2020		In progress	To ensure treated water quality complies with the Australian Drinking Water Guidelines (ADWG), water quality monitoring of the town distribution system must occur. Currently chlorine residual levels are measured weekly			Currently being undertaken 2-3/week. Chlorine analysers are installed, to be bought online. 13 December 2013: Analysers have been installed, not yet linked to shut pump down 28/2/20: Analysers to be linked to telemetry at the end of next week and text message alarm sent. 24/7/20: BDN operator going out 3 x week to test water at bore + 1 x week in retic (pH/chlorine; NTU to be added - instrument to be provided & to be recorded on spreadsheet); chlorine analysers not up to speed, text message alarm (noted with	Develop new carbon copy book for BUG/KBI each with pH/chlorine/NTU (can be left on site + include flow meter in future) - AM will forward draft to JG		
215	Dunedoo	Routine testing	Monitoring	Collect water samples from the distribution system and test for: · Free chlorine residual · pH · Turbidity <i>Results may dictate if dosing rate changes are required to be made at the</i>	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	DUN008	2014	High	Technical Officer	13-Dec-19		4/10/2019	was 31/8/19	Complete	Water quality testing of the distribution system is currently not being performed			Daily pH and chlorine recorded daily and entered into spreadsheet weekly Weekly turbidity not yet entered. Some sheets still to be modified to include turbidity. 13/12/19: Spreadsheet has been modified and turbidity is			
216	Coonabarabran	Sedimentation Ponds	Operations	Monitor the sedimentation ponds daily for contamination sources such as dead animals	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	COO012	2014	High	Supervisor North	28-Feb-20		28-Feb-20	Interim	Closed	Due to the sedimentation ponds being in an open area there is a risk of contamination from the wildlife			Daily walk around includes lagoons 13/12/19: Hunter H2O SOPs to be used as template. Supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote f to develop the rest	To be included as part of action 339 develop SOPs system wide	Consultant	
217	Dunedoo	Water Quality Targets	Operations	Monitor the chlorine residual daily and adjust the dose rate to maintain a consistent residual	5.1	Drinking Water Quality Monitoring	Hunter H2O Audit 2014	DUN007	2014	High	Supervisor South	27-Jun-19				Complete	The chlorine dose rate is not regularly adjusted to control the treated water chlorine residual			Daily chlorine recorded daily and entered into spreadsheet weekly			
218	All		Monitoring	Consider providing water quality data in water rate notices to customers	5.3	Short-term evaluation of			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19				Closed				Currently provided on Council website.			
219	Mendooran	Distribution	Monitoring	That the onsite sampling and testing conducted by the EHO includes turbidity and these field results are provided to the WTP operators on the	5.3	Short Term Monitoring of	Mendooran Boil Water	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete							
220	Mendooran	Distribution / Protocol	Document	That WSC update the daily water quality log sheets to include turbidity and temperature, and CCP limits and actions to be taken if the CCP limits are exceeded. This will prompt the WTP operator to take appropriate actions and notifications if results are above the alert or critical limits. That the WTP operators use a simple system, where they colour in the results (using highlighter pens) to identify where the results lie within the CCP ranges	5.3	Short Term Monitoring of Results	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete							
221	BUGKEN	Documentation /	Document	Record customer complaints in water quality monitoring spreadsheets for Bugaldie and Kenebri water supply systems.	5.3	Short-term evaluation of			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Complete				All customers complaints are recorded in a database 'Complaints and Enquiries'.			
222	All	Information Systems	Operations	Implement regime of regular (daily) review of raw and treated water quality results, and input operational data into an electronic spread sheet to facilitate analysis and reporting.	5.3	Short-term evaluation of results			Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Implemented				Data entered electronically. Daily review of data by operator (manual highlighting of data outside trends) Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting. Quarterly DWMS reviews undertaken Monthly report to General Manager of CCP exceedances.			
223	All	Documentation / Protocol	Document	Establish a rapid communication system (for internal and external communication) to deal with unexpected events. It is recommended this be included in the Emergency Response Plan that is addressed below.	5.4	Corrective Action			Sep-2014	Very high	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed	Draft ERP developed by Bligher Tanner in Jan-16; ERP needs to tie in with BCP Get proposals from consultants (need key players); needs to fit in with BCP	BL: Narromine did something similar; NSW Health to follow up re funding?	Finalisation of ERP to be included as part of NSW Health project. Document responsibility to be allocated, including setting review times 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H2O NSW Health project	To be included as part of ERP update (action 341)	Consultant (NSW Health)		
224	All	Documentation / Protocol	Document	Consider implementing a procedure in consultation with local hospitals to ensure dialysis patient details remain UpToDate.	6.1	Communication			Jun-2016	Low	Technical Officer	24-Apr-20		31-Mar-19	Interim	In progress				Finalisation of ERP to be included as part of NSW Health project. List of dialysis patient previously investigated. 28/2/20: List developed in liaison with Dubbo Hospital (A229). Process still to be developed 24/04/20: Contact list still to be added as a register in authority 24/7/20: referred to in action A341	Refer to action 229 (obtain list of patients) Develop process for distribution and allocate responsibility of keeping document current. Add register to Authority.		
225	All	Documentation /	Document	Define communication protocols with the involvement of relevant agencies and include in the protocols a contact list of relevant agencies and	6.1	Communication			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20				Closed				24/4/20: Closed, included as part IERP development under Action 341.			
226	All	Documentation /	Document	Review and update contact details listed in Table 10.	6.1	Communication			Jun-2015	Medium	Manager Warrumbungle Water	24-Apr-20				Closed				24/4/20: Closed as included under Action 334			
227	All	Documentation / Protocol	Document	Develop a comprehensive public and media communications strategy and include draft public and media notifications.	6.1	Communication			Jun-2015	Medium	Manager Warrumbungle Water; Admin	24-Apr-20		30-Sep-20		Not started				24/4/20: Carole (Admin support) to arrange the development of a communications strategy (to include restriction advice)			

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements	
228	All		Training	Identify an appropriate person to handle all incident and emergency communications and ensure they are appropriately trained.	6.1	Communication			Jun-2015	Medium	Manager Warrumbungle Water	28-Feb-20		31-Mar-20	Interim (Hunter H2O proposal not yet scoped)	Closed				To included as part of updated incident response plan 13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H2O NSW Health project. 20/2/20 - Closed and included as part of new action 341	Ensure that Hunter H20 (NSW Health project) ERP identifies appropriate person to handle incident and emergency communications	Consultant (NSW Health)	
229	All	Distribution	Documentation / Protocol	Obtain list of dialysis patients for each system	6.1	Communication	Risk assessment	10.02	Mar-2015	High	Technical Officer	28-Feb-20		14-Mar-20	Interim was 6/9/19 (get list of patients)	Complete			Finalisation of ERP to be included as part of NSW Health project. List of dialysis patient previously investigated. 13/12/19: Couldn't find existing list. SS is liaising with hospital to develop list	Develop process for distribution and allocate responsibility of keeping document current. Add register to Authority			
230	Mendooran		Training	That WSC staff with NSW Health staff undertake regular, at least annually, familiarisation and/or training in the implementation of NSW Health's drinking water quality incident response protocols.	6.2	Incident and Emergency Response	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water;	22-Jan-19				Complete							
231	Mendooran		Documentation / Protocol	That WSC implement a simple "Water Quality Monitoring Incident Report" sheet for WTP operators to complete if any field results fall outside of the ranges set out on the field monitoring log sheets.	6.2	Incident and Emergency Response	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete							
232	Mendooran		Documentation / Protocol	That WSC review and finalise the DWMS Implementation Report (2016), so that the recommended "Emergency Response Plan" can be utilised for any future incidents and emergencies. It is recommended that an exercise of the incident response plan be organised with the PHU (mid-2018).	6.2	Incident and Emergency Response Protocols	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed		ERP forms part of Councils DMNW and BCP.		Draft ERP Hunter H20 developing updated incident response plan (NSW Health project) 20/2/20 - Closed and included as part of new action 341 &	To be included as part of ERP update (action 341 & 342)	Consultant (NSW Health)	
233	All		Documentation / Protocol	Identify possible water quality related incidents and emergency scenarios (the risk assessment should be used as a basis) and document these potential scenarios in an Incident and Emergency Response Plan. Document procedures and response plans to address these incidents (can refer to guideline protocols from NSW Health as provided in the DWMS). Add to the ERP particular processes that are required to address severe hazard / emergency scenarios, such as algal blooms, fuel spills,	6.2	Incident & Emergency Response Protocols			Mar-2015	High	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed			13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H2O NSW Health project. 20/2/20 - Closed and included as part of new action 341	To be included as part of ERP update (action 341)	Consultant (NSW Health)		
234	All		Documentation / Protocol	Develop a process for investigation following incidents and emergencies and document this process. Include in this process a mechanism for revision of any emergency protocols, where an investigation demonstrates	6.2	Incident & Emergency Response			Mar-2015	High	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed			13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H2O NSW Health project. 20/2/20 - Closed and included as part of new action 341	To be included as part of ERP update (action 341)	Consultant (NSW Health)		
235	All		Documentation / Protocol	Develop a process for documenting and reporting of an incident or emergency.	6.2	Incident & Emergency Response			Mar-2015	High	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed			13/12/19: Confirmed that development of ERP is to be undertaken as part of Hunter H2O NSW Health project. 20/2/20 - Closed and included as part of new action 341	To be included as part of ERP update (action 341)	Consultant (NSW Health)		
236	All		Training	Employees should be trained and protocols regularly tested in the emergency response plans. The requirement for this should be included in the ERP.	6.2	Incident & Emergency Response			Mar-2015	High	Manager Warrumbungle Water	24-Jul-20		31-Mar-20		Closed			24/7/20: closed as included in action A341	To be included as part of ERP update (action 8)			
237	Mendooran		Documentation / Protocol	That WSC develop and implement procedures for all staff involved in sampling and monitoring which clearly reflect responsibilities in accordance with the DWMS, CCP limits and NSW Health protocols for monitoring water quality incidents. This would include investigations and appropriate remedial actions of any Total Coliform detections and to also follow CCP remedial actions for any faecal coliform detections	7.1	Employee Awareness and Involvement	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water	22-Jan-19				Complete							
238	Mendooran		Critical control point	The DWMS CCP summary tables are reviewed, finalised and posted on the noticeboards at the WTP, kept in work vehicles and included in regular training sessions/toolbox talks, incident response protocol/training and included in the water quality monitoring procedures and log sheets.	7.1	Employee Awareness and Involvement	Mendooran Boil Water Alert 2017	MBWA2017	2017	High	Supervisor South	22-Jan-19				Complete							
239	Mendooran	Distribution	Operations	That the WSC include WTP operators and other staff involved in water supply activities to attend the Drinking Water Quality Meetings.	7.1	Employee Awareness and Involvement	Mendooran Boil Water	MBWA2017	2017	Medium	Supervisor South	22-Jan-19				Complete							
240	All		Training	All water management stakeholders must read and agree to abide by the principles of this DWMS. This includes adding this requirement to the role descriptions for Council employees moving forward.	7.1	Employee Awareness and Involvement			Jun-2015	Medium	Manager Warrumbungle Water	24-Apr-20		30-Sep-20		In progress			13/12/19: Previous quarterly water quality meeting have discussed importance DWMS. More recently facilitated improvement meetings have been undertaken for Supervisors/Managers. 24/4/20: Some position descriptions include reference to ADWG. Water quality awareness training to be carried out	Proposal to be reviewed			
241	All		Documentation / Protocol	Consider developing operators communication strategy	7.1	Employee Awareness and Involvement			Jun-2015	Medium	Manager Warrumbungle Water	24-Apr-20		31-Oct-20		Not started			24/4/20: Proposal received by consultant. Roadmap to be developed about how information is handed over to operators. E.g. what information requires formal handover				
242	Mendooran	Staff Training	Training	Ensure staff are adequately trained	7.2	Employee Training	DPI Inspections	DPI MEN001	Jan-2019	High	Manager Warrumbungle Water; HR	13-Dec-19		30/03/2020	Interim	Closed		It is a requirement that water treatment plants be operated by suitably qualified staff i.e. Hold Cert 3 in Water Operations through TAFE or DoI Water operator training. The WTP is not a fully automated plant that requires no supervision. The plant (although some processes are automated) requires regular supervision, monitoring and maintenance	Second operator from Binnaway is being trained to fill in for Mendooran staff. Structure is being finalised. Operators have Cert 3 in Water Operations. 13/12/19: Currently reviewing competencies and aligning with national certification framework, processes to identify any shortfalls in training 28/02/20: Are progressing the review with NCF. Have determined competency requirement for each plant determined by plant complexity/treatment. Gap analysis and training plan still to be completed. Closed as covered by action 249.	Review training requirements for Mendooran staff following restructure.			

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements
243	Mendooran		Training	That WSC investigate and implements a process of its WTP operators to be certified under the National Certification Framework.	7.2	Employee Training	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water; HR	24-Apr-20		30/06/2020		In progress		Referred to HR		Ongoing with HR 13/12/19: Currently reviewing competencies and aligning with national certification framework, processes to identify any shortfalls in training 24/4/20: Review has been undertaken and training plans	Cornelia to follow up	
244	Mendooran	Disinfection / Protocol	Document	That the Human Resources records for relevant staff are reviewed, and that training is undertaken for all water supply operational staff, WTP operators and relief staff to upskill and to be appropriately trained in WTP processes (i.e. DPI-Water Part 1 and 2 as a minimum). It is also recommended that all staff involved with water quality sampling, testing and monitoring, undergo training and are involved in developing procedures for their work tasks.	7.2	Employee Training	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Manager Warrumbungle Water; HR	22-Jan-19				Implemented		Referred to HR				
245	All		Training	Formalise internal on-the-job training processes, documenting the training content, processes and attendance.	7.2	Employee Training			Jun-2015	Medium	Manager Warrumbungle Water	24-Apr-20		31-Jul-20		In progress				Process not yet formalised. Informal current process includes on the job training, competency document, annual review against competency document. Consultant has been engaged to provide site induction material (currently scheduled to start mid Dec 19). 24/4/20: Consultant has provided general induction		
246	Mendooran	Reservoirs	Training	Consider working at heights training for staff	7.2	Employee Training	Risk assessment	9.01	Mar-2015	Medium	Manager Warrumbungle Water	27-Aug-19				Complete				Training undertaken for water treatment staff (May 2019)		
247	BIN, BAR, MDN	Whole of System	Document / Protocol	Review staff structure of water services team, PHU and NOW to provide support	7.2	Employee Training	Risk assessment	11.06	Mar-2015	Medium	Manager Warrumbungle Water	24-Apr-20		20-Jun-20		Implemented				Review on staff structure has been undertaken and revised structure is being implemented. 24/4/20: Restructure in Dec 2020. Issue from 2014 risk assessment on reporting have been rectified, action		
248	CBN, BIN, MDN	Organisations	Training	Operators to re-familiarise themselves with BGA Management Protocols and related response actions.	7.2	Employee Training	CWT report May-15		May-2015	Medium	Supervisor Treatment	24-Apr-20		31-Dec-19		Closed	(Section 4.1, p.6)			Action changed to cover CBN, BWY, MDN systems (from just CBN) 27/9/19: SS printed and laminated (A3) and distributed to CBN, BWY, MDN(?); CW to check with Supervisors if operators have familiarised themselves 13/12/19: Latest BGA has been provided to plants (laminated) 24/4/20: Plants are displayed at CBN & MDN.	Supervisor to review BGA plan onsite with operators, prior to lagoon sampling.	
249	All	Operator training	Training	Arrange for operators to undertake appropriate training	7.2	Employee Training	Hunter H2O Audit 2014	COH001, DUN001	2014	High	Supervisor/Manager/HR	24-Jul-20		31/03/2021		In progress	Operators have not yet completed their fluoridation certification and/or require further training in WTP operations			Confined space and working at heights undertaken 2019. Other training gaps to be reviewed. Manager has requested training schedule from HR. 13/12/2019 Currently reviewing competencies and aligning with national certification framework, processes to identify any shortfalls in training 28/02/20: Are progressing the review with NCF. Have determined competency requirement for each plant and training plan still to be completed. action 242 closed as considered as covered by this action. 24/7/20: requirements as per NCF included in PDs; fluoridation going to be covered as part of funded NSW	Review training requirements for Mendooran staff following restructure (action 242)	CW to check with HR how training plan is going to be administered/ where it is up to [what is action 242? - fluoridation]; what are our operators lacking?? (KH/PP water training)
250	All		Document / Protocol	Council may consider providing water quality data on residents rates notices and/or publishing some of this data on their website and in Council's	8.2	Communication			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19				Complete				Currently provided on Council website.		
251	All		Document / Protocol	Develop a consumer information program providing details on the DWMS, Emergency Response Plan, consumer responsibilities, how drinking water quality may be affected in household distribution and drinking water uses	8.2	Communication			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20				Implemented				24/4/20: Four monthly improvement plan update reports are made available on Councils website. General information included on water treatment, including micro, chemical data;		
252	All	Performance monitoring	Monitoring	Increase review of water quality performance and utilisation of water quality data to improve understanding of the effectiveness of treatment and to identify water quality trends and patterns.	9.1	Investigative Studies & Research Monitoring			Sep-2016	Low	Manager Warrumbungle Water	27-Aug-19				Implemented				Quarterly DWMS reviews undertaken Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting. Monthly report to General Manager of CCP exceedances.		
253	All	Catchment & Abstraction	Investigative Studies & Research Monitoring	Consider instigating a pesticide monitoring program	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.01	Mar-2015	Medium	Technical Officer	13-Dec-19		28-Feb-20	Interim deadline was 13/9/19 (review RWQ assurance)	Closed				13/12/19: Can confirm pesticides are monitored as part of raw water assurance program Action closed, included as part of new action A347	Review raw water assurance program against this requirement see items 120, 253, 287, 313)	
254	BIN, BUG, CBN, DUN, KEN	Catchment & Abstraction	Investigative Studies & Research Monitoring	STP effluent review (i.e. quality, quantity from EPA report) to determine typical characteristics in effluent and the quality of treatment. Consider testing for E.coli in raw water.	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.04	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				STP are being upgraded, BIN and MDN are being sewerred (options study).		
255	All	Catchment & Abstraction	Investigative Studies & Research Monitoring	Consider undertaking chemical testing on groundwater supplies to establish baseline water quality	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.07	Mar-2015	Medium	Manager Warrumbungle Water; EHO; Technical	30-Jul-19				Implemented				Raw water testing regime program has been developed and implemented.		
256	Baradine, Kenebri, Coona	Catchment & Abstraction	Investigative Studies & Research Monitoring	Review of existing coal seam gas investigations in the area (i.e. EPA)	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.07	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Discussed at quarterly meeting. Raw water pH tested daily at Baradine and Coonabarabran, to be used as a potential indicator		
257	Mendooran	Disinfection	Investigative Studies & Research	Monitor the strength of the chlorine over a period of 6 months	9.1	Investigative Studies & Research	Risk assessment	7.01	Mar-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed				Covered by action 198		
258	All	Critical control point	Investigative Studies & Research Monitoring	Council should strongly consider investing in online monitoring at all CCPs. This would provide greater process control, as immediate notification would be provided in the event an alert limit is exceeded. Importantly, it would also provide the opportunity of an immediate response in the event a critical limit is exceeded (such as triggering a plant shut down). Online monitoring would also provide useful data for analysis of performance of processes used to control hazards at CCPs and would improve understanding of the	9.1	Investigative Studies & Research Monitoring			Mar-2015	High	Manager Warrumbungle Water; Project Engineer	28-Feb-20		30-Jun-20		Closed				Funding granted from Safe and Secure for scoping study of automation. 13/12/19: PLC are needed to install online analysers 28/2/20: Closed as covered under A328.	To be included as part of process monitoring, automation and instrumentation project (action 328)	

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements		
259	DDO	Catchment & Abstraction	Investigation	DDO to be tested prior to new bore installation. Results to be followed up.	9.1	Investigative Studies & Research Monitoring	Risk assessment	1.12	Mar-2015	High	Supervisor Treatment; Technical officer	24-Jul-20		31-Oct-20		In progress				13/12/19: Bore is being used. Raw water quality assurance plan includes bore testing. Have NSW Health funding to take baseline sampling, some still to be taken, (Health officer has since left) 28/2/20: Schedule to be developed 24/7/20: labels for 5th bore background testing got lost (AM follow up with Health); RWQ procedure requires updating re	Supervisors to take samples for the bore baseline sampling program. Tech Officer to create schedule (baseline and			
260	All	Document / Protocol	Investigation	As part of Council's review of the DWMS risk assessment, review and discuss the effectiveness of existing processes and procedures in managing water quality. The review should draw on external research and information, the risk assessment, water quality analysis and organisational experience. <u>With any changes in conditions, processes and procedures</u>	9.2	Validation of Processes			Sep-2015	Low	Manager Warrumbungle Water	27-Aug-19				Closed				Covered by review of DWMS review and update (action 334)				
261	Coonabarabran	Catchment & Abstraction	Investigation	Review PAC dosing effectiveness. Detention time for PAC limiting factor	9.2	Validation of Processes	Risk assessment	1.1	Mar-2015	Medium	Supervisor North; Technical Officer	13-Dec-19				Closed				Calculations previously performed, to be reviewed and effectiveness considered as part of PAC upgrade investigations. 13/12/19: Calculations have been reviewed detention time can be improved by moving dosing point upstream. PAC currently used as an aid in flocculation and detention time is sufficient for flocculation (not for algae). If there is an algae				
262	All	CT	Investigation	Review and confirm the various data gaps in Table 11 to calculate CT for all supply systems.	9.2	Validation of Processes			Mar-2015	High	Supervisors; Technical Officer	13-Dec-19		15-Oct-19	was 30/9/19	Complete				27/9/19: engaged CWT to calculate CTs; supervisors/SS to provide info as required refer to ID 326 13/12/19: CTW were engaged to calculate CT. Report has				
263	All	Document / Protocol	Investigation	Develop a policy on validation of new or upgraded water supply infrastructure. This should include witness, demonstration and commissioning requirements that are designed to ensure the infrastructure	9.3	Design of Equipment			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20		30-Sep-20		In progress				In progress, no documents yet developed 24/4/20: Increased priority to Medium. Consulting provided proposal	Draft document			
264	All	Document / Protocol	Investigation	Review existing documentation on the water supply systems and ensure all are captured on Council's document management system. Verify documents are UpToDate.	10.1	Management of Documentation & Records			Sep-2015	Low	All	24-Apr-20		30-Nov-20	was 30-9-19; revise next month	In progress				InfoXpert used as document management system. Incoming correspondents are documented. Staff have received training. Implementation still ongoing. 27/9/19: added to supervisor checklists; Jacinta provided current location + procedure	Water project information to be put on InfoXpert (all)			
265	Mendooran	Distribution / Protocol	Document	That WSC review and regularly revise these water supply reticulation plans (Figures 4 & 5) as required to maintain an up to date records.	10.1	Management of Documentation and Records	Mendooran Boil Water Alert 2017	MBWA2017	2017	Medium	Supervisor South; GIS Officer	22-Jan-19				Implemented				In collaboration with Council's GIS Officer				
266	All	Document / Protocol	Document	Continue to document information pertinent to all aspects of drinking water quality management.	10.1	Management of Documentation &			Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented								
267	All	Document / Protocol	Document	Develop a procedure that manages document control for all DWMS documentation (i.e. ensure the currency, accessibility and appropriate	10.1	Management of Documentation &			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20				Closed				24/4/20: Closed as covered by under new action 334, review and update DWMS.	Include as part of DWMS review and update			
268	All	Document / Protocol	Document	Develop a records management process to ensure appropriate storage and accessibility of DWMS related records.	10.1	Management of Documentation &			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20		31-Dec-20		In progress				24/4/20: Procedure (Drinking water management system document register procedure) has been developed. Still to be	Procedure to be reviewed and			
269	All	Document / Protocol	Document	Update details for existing documentation in the DWMS document register.	10.1	Management of Documentation &			Sep-2015	Medium	Manager Warrumbungle Water	24-Apr-20				Closed				24/4/20: Closed as covered by under new action 334, review and update DWMS.	Include as part of DWMS review and update			
270	ALL	Information Systems	Operations	Generate a list of equipment contained on site and store equipment operation and maintenance manuals on site. Routinely (daily) measure the instantaneous chemical dose rate and daily chemical usage. Also record instantaneous and daily plant flow rates to determine actual chemical dose rates. This is useful for chemical and plant optimisation and future troubleshooting and operations. Install a calibration tube to allow instantaneous chemical dose rates to be measured.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	BIN004, BUG002, COH002, DUN003, KEN002,	2014	Medium	Supervisor Treatment	24-Apr-20		TBC		Prioritised under automation scoping project	Closed				Instantaneous chemical dose rates, daily chemical usage, instantaneous and daily plant flow rate data is currently not being recorded. This data is important for plant operation, optimisation and troubleshooting Equipment operation and maintenance manuals are currently not stored onsite. Access to equipment manuals can assist in	Development of schedules covered under action 340. Calculations to be undertaken for chemical dose and usage rate (In conjunction with action 213) Calibration tube - MDN to be replaced (others all have them) 24/4/20: Chemical dose rate being calculated. Cannot currently measure daily chemical usage. Ability to enable chemical usage included as part of automation scoping study recommendations. Additional equipment needed. MDN calibration tube still needs cleaning Action closed, *Development of schedules covered under action 340. *Chemical dose rate being calculated. *New actions for outstanding items 348 and 349	Chemical usage equipment required, dependent on priorities in Hunter H2O scoping study automation project	
271	BDN, CLH (MDN/ KBI?), BUG	Information Systems	Display	Display the pressure vessel calibration certificates nearby the pressure vessels.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	MEN003, KEN004	2014	High	Supervisor Treatment; Technical officer	24-Jul-20		30/06/2020		Complete	Calibration certificates for pressure vessels are not stored on site; Plant pressure vessels currently do not have calibration certificates displayed			27/9/19: check new bore sites for pressure vessels; no progress on MDN (see ID 272) current pressure tanks are for water (bores) + compressor vessels at BDN, CBN, MDN 13/12/19: Clarifying which contractors do this 28/2/20: Australian Boilers Services undertake this for Dubbo. 24/4/20: Received quote from contractor (MDN, CBN, BAR) 24/7/20: certification has occurred in June; required every two years, on Supervisor Treatment list see ID 271				
272	Mendooran	Information system	Perform	Perform pressure vessel calibration and display certificates on site.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	MEN005	2014	High	Supervisor South	27-Aug-19		31/08/2019	closed 27/9/19	Closed	Plant pressure vessels currently do not have calibration certificates displayed							

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273	Mendooran	Reservoirs	Document / Protocol	That WSC urgently develop and implement a regular (weekly/monthly/annual) reservoir integrity inspection and reporting program for the Mendooran water supply system. This inspection and reporting program should be used to develop an Action Plan in order to urgently address all the existing integrity issues at the Mendooran water supply system. Annual reservoir integrity reports to be submitted to DPI-Water in accordance with LWU Circular No. 18.	10.2	Reporting	Mendooran Boil Water Alert 2017	MBWA2017		2017	High	Manager Warrumbungle Water	28-Feb-20		28-Feb-20		Closed		Finance assistance being sought through NSW Health for development of Standard Operating Procedures, including reservoir inspections. Reservoir access to be quarterly		Engaging contractor to develop reservoir integrity checklist to undertake inspections. Including assessing WHS issues that are limiting inspections currently. Visuals inspections are currently recorded in diaries. 13/12/19: Engaged WEARS to develop reservoir integrity checklist to undertake inspections 28/20/20: Action closed as covered by new action 343	Follow up with WEARS	Contractor	
274	Mendooran		Document / Protocol	That WSC undertake an annual internal review of its DWMS, using the HH2O revised NSW Health's annual report template and consult their local PHU to develop an appropriate external review/audit frequency.	10.2	Reporting	Mendooran Boil Water Alert 2017	MBWA2017		2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented		Quarterly internal reviews undertaken					
275	All		Document / Protocol	Develop inhouse evaluation of long-term water quality performance procedures (outside external monitoring requirements) and implement these procedures. These procedures could be incorporated into the preparation process for the annual management review or as part of the internal audit process.	11.1	Long-Term Evaluation of Results				Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented			Annual review 6 monthly level of service report (non compliances, boil water alerts etc.) Quarterly DWMS reviews undertaken Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in				
276	All		Document / Protocol	Ensure all handwritten water quality data is captured in electronic spreadsheets.	11.1	Long-Term Evaluation of				Mar-2015	High	Manager Warrumbungle Water	30-Jul-19				Implemented							
277	All		Document / Protocol	Develop internal audit procedures and schedules appropriate to functionality of council and the water supply systems.	11.2	Audit of Drinking Water Quality				Sep-2015	Low	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed			13/12/19: Consultant has provided proposal to review and update DWMS	Review schedule as part of DWMS project update			
278	All		Investigations	Identify appropriate personal to undertake the internal audit and provide training in auditing.	11.2	Audit of Drinking Water Quality				Sep-2015	Low	Manager Warrumbungle Water	24-Apr-20		TBC		Not started			Wait until NSW Health audit guidance is audits				
279	All		Critical control	Document and report results of CCP exceedances in annual report for Council	11.2	Audit of Drinking Water Quality				Sep-2015	Low	Manager Warrumbungle Water	24-Apr-20		31-Oct-19		Complete			CCP results reported monthly to General Manager. Annual report being developed (to go to Council)				
280	All		Document / Unit.	Develop external audit procedures in consultation with NSW Public Health Unit.	11.2	Audit of Drinking Water Quality				Sep-2015	Low	Manager Warrumbungle Water	24-Apr-20		TBC		Not started			Wait until NSW Health audit guidance is audits				
281	Mendooran		Document / Protocol	That WSC develop and implement a DWMS review and continual improvement program which is regularly reviewed by the Senior Executive Team and reported to Council.	12.1	Review by Senior Executive	Mendooran Boil Water Alert 2017	MBWA2017		2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented		Improvement Plan is under review, to be discussed in details at next DWQ review					
282	Mendooran		Document / Protocol	That notices received from DPI-Water should be regularly reported to senior management together with an Action Plan, Works Budget and Timeline for the rectification of issues raised during DPI-Water Inspections. This Action Plan information should also be regularly reported back to DPI-	12.1	Review by Senior Executive	Mendooran Boil Water Alert 2017	MBWA2017		2017	High	Manager Warrumbungle Water	22-Jan-19				Implemented		List of outstanding recommendations has been					
283	Mendooran		Document / Protocol	That WSC review and update the DWMS and the "DWMS Improvement Plan" is then kept up-to-date, recommended improvements are implemented in the order of identified urgency and progress of the "DWMS Improvement Plan" is reported regularly to the Senior Executive Team and Council. This information should also be passed onto NSW Health and DPI-Water for advice, review and comment. (Noting that actions from many of the other	12.1	Review by Senior Executive	Mendooran Boil Water Alert 2017	MBWA2017		2017	High	Manager Warrumbungle Water	13-Dec-19		31-Oct-19		Implemented	Improvement plan is being consolidated	Refer to R11 and R12	Improvement plan has been consolidated. Plan to be provided to NSW Health as part of annual review. Quarterly updates to be provided to Council. 13/12/19: Improvement plan and annual review report have been provided to NSW Health				
284	All		Document / Protocol	Amend/update the DWMS where it is evaluated that there is a need for change.	12.1	Review by senior executive				Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Closed			Covered by DWMS update (action 334)	Include as part of DWMS review and update			
285	All		Document / Protocol	Develop and implement a process (including a schedule) for senior executive review of the effectiveness of the management system. The review process should include aspects such as; reports from audits, water quality performance, previous reviews, concerns from consumers and regulators and impacts of changes to internal or external conditions (e.g. regulatory, technology, organisational activities).	12.1	Review by senior executive				Mar-2015	High	Manager Warrumbungle Water	28-Feb-20		30-Jun-20		Closed			Quarterly DWMS reviews undertaken Fortnightly review of CCP data (exceedance summaries), sent to Supervisors and Manager and reviewed in operations meeting. Monthly report to General Manager of CCP exceedances. Draft schedule has been drafted. To be implemented 28/2/20 No longer reporting monthly to General Manager. Annual update to Council (DWMS annual review report and improvement plan tabled). Review schedule to be formalised	Schedule to be formalised in DWMS. Include as part of DWMS review and update (action 334)			
286	All		Document / Protocol	Update and review Implementation Plan when necessary. Follow up actions to ensure deadlines are met and responsible parties are capable to undertake these actions.	12.2	Drinking Water Quality Management Improvement Plan				Sep-2015	Medium	Manager Warrumbungle Water	30-Jul-19				Implemented			Plan has been compiled and in process of reviewing.				
287	All	Bores	Monitoring	Monitoring of ALL WSC bores be increased which includes: <input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/> Microbiological <input type="checkbox"/> Temperature <input type="checkbox"/> Pesticides <input type="checkbox"/> Heavy Metals			July 2018 ORANA meeting	WarrumSCJul 18.1		Jul-2018	Medium	Technical Officer	24-Apr-20		Interim deadline was 13/9/19 (review RWQ assurance program)	28-Feb-20		Closed			Raw water quality assurance program has been developed. To be implemented. 27-9-19: similar to ID 120 13/12/19: RWQ plan still to be reviewed for this requirement Action closed, included as part of new action A347 Action closed, included as part of new action A347	Review raw water assurance program against this requirement see items 120, 253, 287, 313)		
288	All	Raw water	Monitoring	It should be noted that radiological tests are generally recommended every 2 years for bore waters and every 5 years for surface water. As these tests are infrequent, they can often fall out of a routine sampling program and it would be prudent for WSC to check if these test have been undertaken for			July 2018 ORANA meeting	WarrumSCJul 18.2		Jul-2018	Medium					27-Aug-19		Complete			Radiological testing has been undertaken (July 2019) and is included in raw water monitoring assurance plan.			
289	All	Disinfection	Training	Training needs to be undertaken on the chlorine test kits to ensure operators are aware of the different testing ranges.			July 2018 ORANA	WarrumSCJul 18.3		Jul-2018	High	Technical Officer	27-Aug-19				Implemented			Technical officer provided SOPs, training and necessary reagents to operators.				
290	Mendooran	Filtration	Operations	online combined filtered water turbidity meter was reading consistently and significantly lower than the bench unit. WSC will require ongoing investigations, which may include external calibration of both the online and bench unit to confirm what the true turbidity values are and to resolve the discrepancy between the units.			July 2018 ORANA meeting	WarrumSCJul 18.4		Jul-2018	High	Supervisor Treatment	24-Jul-20		31-Aug-20		In progress			Has been externally calibrated. 27/9/19: confirm range of instrument; confirm bypass is not an issue (should be inline?); cleaned regularly? 13/12/19: Issue not resolved 28/02/20: Issue not resolved. Test against hand held unit. Similar issues at other plant. 24-7-20: IPAC instrument calibrations were done in March	To be investigated further Get calibration kit (low)			

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements	
291	Mendooran	WTP	Document / Protocol	Within the new package of works planned for this plant it is recommended that a new set of P&IDs be created and the current plant along with upgrades go through the HAZOP process.			July 2018 ORANA meeting	WarrumSCJul 18.5	Jul-2018	Medium	Project Engineer	24-Apr-20		30-Sep-20	Interim (finish concept design)	Closed				24/4/20: Preliminary hazard assessment included in current engagement, scheduled for 14 May 2020. Concept design workshop to be held in following with to hazard assessment. Not at stage for HAZOP. Action closed, as now covered into new combined Action			
292	Coonabarabran, Mendooran, Binnaway	Monitoring	Operations	Due to an increasing taste and odour issue, it was recommended that WSC look at additional testing in the sedimentation lagoons including MIB and Geosmin, chlorophyll-a (algae), pH, organic loadings and nutrient levels. It was noted that WSC had used PAC in the past, however it is not currently in use. This could be re-established if required, however it would be prudent to understand the cause of the taste and odour and also undertake PAC testing to determine what type and amount of PAC would be the most effective.			July 2018 ORANA meeting	WarrumSCJul 18.6	Jul-2018	Medium	Supervisor Treatment	24-Apr-20		31-Jan-20	Interim was 30-9-19; now: 31/1/20 for algae tests (establish location for algae - put in operational sheet)	Closed				27/9/19: PAC has been dosed at Coonabarabran to control taste and odour issues; PAC dosing also improved filtered water NTU; SS find results from algae testing and put on T-drive (for dam, weir, sedimentation lagoon) added BWY + MDN (river/lagoons) 13/12/19: Some result have been added, still to confirm if all results have found. PAC can only be dosed at Coonabarabran. 24/4/20: No taste and odour complaints. PAC being dosed at			
293	BUG, KEN	Raw water	Investigations	There was discussion relating to fracking activity in the area of Pilliga Forrest. It is recommended that WSC discuss these concerns with NSW Health to determine the best testing parameters to ensure there has been no			July 2018 ORANA meeting	WarrumSCJul 18.7	Jul-2018	Medium		27-Aug-19				Complete				Has been investigated, pH should be used as a parameter, which is already being tested for.			
294	ALL	Reticulation	Document / Protocol	There was discussion around who collects the reticulation samples and analyses them before they are sent to FASS. The Councils Environmental Health Office collects and tests the samples. There have been some issues with samples being collected at the wrong location. It was recommended that Council develop a procedure that includes photos and GPS locations to ensure that samples are always collected at the correct location.			March 2018 ORANA meeting	WarrumSCMa r18.1	Mar-2018	Medium	Technical Officer	24-Apr-20		30-May-20	Interim (Found and reviewed)	In progress	July 18: Ongoing, This was discussed and the newly appointed EHO is managing this project.			Information for plan is in process of being collected. 27/9/19 & 13/9/19 & 24/4/20: info needs to go on T-drive; some photos still need to be taken; sample sites require updating (+photos added) + incident flowcharts added 24/4/20: Find procedure and photos on G drive (Simone who developed them has left) and review status. Scott to talk to	Undertaken in conjunction with action 205 and 206 (Develop a verification monitoring plan)		
295	CBN, BAR,	Fluoridation	Critical control	The fluoride critical limit for Coonabarabran and Baradine and Binnaway need to have the limit of <0.9mg/L for >72 hours (move from the alert limit)			March 2018 ORANA	WarrumSCMa r18.2	Mar-2018	High		27-Aug-19				Complete				CCP reference document updated			
296	ALL	Monitoring	Monitoring	Council to review sample locations. It may be worthwhile changing some sample locations to monitor in the main rather than a household tap.			March 2018 ORANA	WarrumSCMa r18.3	Mar-2018	Medium		27-Aug-19				Closed	Not feasible						
297	ALL	Reticulation	Major works	There are a number of old cast iron mains that cause issues (corrosion, low chlorine residuals). Some of these mains are being replaced, consider developing a program/funding for replacing more of these sections of these			March 2018 ORANA meeting	WarrumSCMa r18.4	Mar-2018	Medium		27-Aug-19				Implemented				Program of replacement of mains is in place			
298	ALL	Reticulation	Investigations	Flushing of mains to assist with maintaining chlorine residuals is problematic during water restrictions (customers see that water is being wasted). Consider ways to collect and reuse the water (e.g. tankers).			March 2018 ORANA meeting	WarrumSCMa r18.5	Mar-2018	Medium		01-Jul-18				Complete	Complete July 2018						
299	Baradine	Reservoirs	Minor works	There is a significant amount of sediment in the Baradine reservoir and this needs to be removed during winter.			March 2018 ORANA	WarrumSCMa r18.5	Mar-2018	Medium		01-Jul-18				Complete	Complete July 2018						
300	ALL	Disinfection	Critical control point	It is recommended that Council confirm that the chlorine contact time for each system has been calculated. It is recommended that a comment be added into the report (under the CCP table) to advise that the chlorine residual measured at AA must be maintained above x mg/L at y plant flowrate to meet			March 2018 ORANA meeting	WarrumSCMa r18.6	Mar-2018	Very high		27-Aug-19				Closed	Ongoing July 2018			Closed covered by action 326.			
301	Binnaway	Monitoring	Investigations	The Binnaway turbidity graph indicates that there are times when the filtered water turbidity results are higher than the clear water turbidity – investigate and check data.			March 2018 ORANA meeting	WarrumSCMa r18.7	Mar-2018	High		27-Aug-19				Complete	July 18: To be reviewed following filter media replacement Since the filter media has been changed the filter water data has been lower then			Issue has been resolved following filter media inspection			
302	Coolah	Disinfection	Document / Protocol	The process flow diagram for Coolah needs to be modified to chlorine gas (rather than sodium hypochlorite) for disinfection.			March 2018 ORANA	WarrumSCMa r18.8	Mar-2018	Medium	Technical Officer	27-Aug-19		6-Sep-19	completed mid Sept-19	Complete	July 18: Ongoing			PFD to be updated			
303	Coolah	Monitoring	Critical control	The location of Coolah critical control point CLL1 needs to be moved to prior to the reservoirs.			March 2018 ORANA	WarrumSCMa r18.9	Mar-2018	High		27-Aug-19				Complete	July 18: Ongoing						
304	CLH, DUN,	Disinfection	Critical control	Council could consider lowering the lower limit on Coolah, Mendooran and Dunedoo critical control point from <0.5 mg/L to <0.2mg/L once the chlorine			March 2018 ORANA	WarrumSCMa r18.10	Mar-2018	Medium	Technical Officer	27-Sep-19				Complete	July 18: Ongoing			Confirm this has occurred			
305	Dunedoo	Monitoring	Critical control	Critical control point for Dunedoo DD01 needs to be moved on the process flow diagram to after the reservoir.			March 2018 ORANA	WarrumSCMa r18.11	Mar-2018	Medium	Technical Officer	27-Sep-19				Complete				Confirm this has occurred			
306	Dunedoo	Monitoring	Document / Protocol	There seemed to be some issues with the Dunedoo summary data in Table 5.3 (some rows not in correct locations, e.g. Bowman 28 Nott Street free chlorine and pH lines were swapped?). Also need to check the lower limit			March 2018 ORANA meeting	WarrumSCMa r18.12	Mar-2018	High		01-Jul-18				Complete	Completed July 2018						
307	Coonabarabran	Filtration	Critical control point	Consider modifying for Coonabarabran CCP for filtered water turbidity: • Operational target < 0.2 NTU (current value <0.8 NTU) • Adjustment Limit < 0.5 NTU (current value >0.9 NTU)			October 2017 ORANA meeting	WarrumSCOc t17.2	Oct-2017	High	Supervisor North; Technical Officer	13-Dec-19		1-Jun-20		Complete	Mar 18: Turbidity targets were slightly reduced. Plant not capable of lower performance – need to consider upgrade			Currently using emergency back up bores. Filter media inspection undertaken recently (never been replaced). Turbidity target limit has been changed to 0.3 NTU, operational limit 0.5 NTU. Will have difficulty in meeting limit when source water is changed to the dam water. 13/12/19: Following improvements to filter, reduced limits should be able to be achieved when source water is			
308	Coonabarabran	Fluoridation	Critical control point	A new lower limit needs to be added to the Coonabarabran fluoridation CCP of <0.9mg/L for >72 hours, to be in line with the NSW Health Form 5 requirements (Fluoride Dosing Incident Notification).			October 2017 ORANA meeting	WarrumSCOc t17.5	Oct-2017	High	Technical Officer	27-Aug-19				Complete	Mar 18: Some changes were also made to the fluoride CCP limits. The critical limit needs to have the limit of <0.9mg/L for >72 hours (move from the alert limit).						
309	ALL	Reservoirs	Critical control point	There were no reservoir inspections undertaken during the reporting period. The Council needs to resolve access and training so that this CCP can be implemented.			October 2017 ORANA meeting	WarrumSCOc t17.6	Oct-2017	High		27-Aug-19				Closed	Mar 18: Coolah and Dunedoo reservoirs inspected daily (walk around the ground). Checklists/SWMS/SOP needs to be			Covered by action 107 and 310.			
310	ALL	Reservoirs	Document / Protocol	Council needs to develop reservoir inspection checklists for the operators and provide training on the important areas to check closely during the inspection.			October 2017 ORANA meeting	WarrumSCOc t17.7	Jun-2019	High	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed				Have queried contractor to assist with checklist 13/12/19: Engaged WEARS to undertake this work 28/20/20: Action closed as covered by new action 343	Follow up with WEARS	Project management resource needed	
311	Baradine	Monitoring	Critical control point	Review CCP limits for Baradine WTP, in particular, the turbidity targets are not in line with the ADWG (see action WarrumSCOc17.2 above)			October 2017 ORANA meeting	WarrumSCOc t17.10	Oct-2017	High	Supervisor North; Technical Officer	27-Aug-19				Closed	Mar 18: Limits are now: Target < 0.2 NTU Alert < 0.4 NTU Critical < 0.8 NTU This is still not as low as the ADWG – this may be OK as the source water is from			Closed. Covered by action 78			
312	Binnaway	Monitoring	Critical control point	Review CCP limits for Binnaway WTP, in particular, the turbidity targets are not in line with the ADWG (see action WarrumSCOc17.2 above). Consider ways to improve the plant performance			October 2017 ORANA meeting	WarrumSCOc t17.11	Oct-2017	High		27-Aug-19				Complete	Mar 18: Filter media replacement planned for mid 2018. Review limits once new filter media performance monitoring data is			Limits have been reduced in line with ADWG			

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019;	Short term actions	Resource requirements
313	Coolah	Raw water	Monitoring	Coolah has a new bore "Back Bore" which is located 50m upstream of a previous dump site (near Pound yard and tip) in depth water quality testing should be considered, this could be requested from NSW Health	ORANA	WarrumSCSe	meetings pre October 2017	pt16.2	Oct-2017	Medium	Technical Officer; Manager Warrumbungle Water	24-Apr-20		28-Feb-20	Interim deadline was 13/9/19 (review RWQ assurance)	Closed				Confirm if current testing (NSW Health project) is sufficient; what else should be tested for if not? 13/12/19: RWQ plan still to be reviewed 24/4/20: Scott to review record of test results for "back bore" records	Review raw water assurance program against this requirement see items 120, 253, 287, 313)	
314	Binnaway	Filtration	Investigations	Filter media has been washing out of filters, further investigations could be undertaken to ensure the filter media and design is appropriate	ORANA	WarrumSCSe	meetings pre October 2017	pt16.3	Oct-2017	Medium	Supervisor South	13-Dec-19		31-Dec-19		Complete				Media has been replaced. 13/12/19: No washout has been occurring	Confirm if filter media is still washing out of filters	
315	CLH, DUN		Investigations	Coolah and Dunedoo bores may have a risk due to flooding and local land use this should be reviewed and additional monitoring could be requested from NSW Health during high rainfall/flood periods. It was recommended that	ORANA	WarrumSCSe	meetings pre October 2017	pt16.4	Oct-2017	Medium	Supervisor Treatment	24-Apr-20		30-Sep-20		In progress				13/12/19: RWQ plan still to be reviewed for this requirement 24/4/20: To be included as part of an operational monitoring plan testing.		
316	Mendooran	Sedimentation	Plant optimisation	Questions were also raised on the Mendooran sedimentation lagoons and short circuiting and increased risk of slug return of backwash water. This will be raised at the next DWQOM, Dec 2016	ORANA	WarrumSCSe	meetings pre October 2017	pt16.6	Oct-2017	High	Manager Warrumbungle Water	28-Feb-20		30-Sep-20	Interim (finish concept design)	Closed				13/12/19: Consultant engaged to undertake concept design (site visit has already been undertaken - Nov 2019) 28/2/20 Quotes to undertake work are being reviewed	Included as part of treatment water supply upgrade	
317	Coonabarabran	WTP	Plant optimisation	Further optimisation and investigation is to be undertaken at Coonabarabran WTP.	ORANA	WarrumSCSe	meetings pre October 2017	pt16.7	Oct-2017	Medium		27-Aug-19				Closed				Covered by a variety of other specific actions		
318	Binnaway	WTP	Investigations	Review the Bligh Tanner report on Binnaway WTP and initiate recommended actions (on-line monitoring, filter replacement, telemetry,	ORANA	WarrumSCMa	meetings pre October 2017	r17.3	Oct-2017	High		27-Aug-19				Closed				Actions from Bligh Tanner report reviewed as part of this improvement plan		
319	Binnaway		Plant optimisation	Review the pH target for Binnaway and set based on optimum for pH and calcium carbonate precipitation potential.	ORANA	WarrumSCMa	meetings pre October 2017	r17.4	Oct-2017	Medium	Supervisor Treatment	24-Apr-20		1-Feb-21		Closed				To be further investigated 24/4/20: Not considered to be a current issue		
320	Baradine	Reservoirs	Minor works	Council to check if replacement of the ladder on the Baradine Reservoir is included in the Lower Macquarie Alliance reservoir work.	ORANA	WarrumSCMa	meetings pre October 2017	r17.5	Oct-2017	Medium		27-Aug-19				Complete				Internal ladder has been replaced. External ladder to be investigated as part of reservoir upgrades.		
321	Baradine	WTP	Major works	Baradine plant is old and in poor condition, particularly the clarifier. Upgrade work is recommended and DPI Water (Bill Ho) recommended installing sedimentation ponds (1 for sedimentation and 1 for sludge storage). NSW Health supports the installation of a clarifier. Council to discuss further with	ORANA	WarrumSCMa	meetings pre October 2017	r17.6	Oct-2017	High		27-Aug-19				Closed	Mar 18: Council submitted EOI for Safe and Secure funding			Approval for funding for clarifier. Waiting for s60 endorsement and funding endorsement by DoI Water. Closed, covered by action 192		
322	Baradine	Disinfection	Investigations	Baradine WTP - Council needs to recalculate the chlorine contact time with the lower plant flow (10L/s, not 16L/s) and determine the chlorine residual required for effective disinfection. A previous report by Blyth Tanner	ORANA	WarrumSCMa	meetings pre October 2017	r17.6	Oct-2017	High		27-Jun-19				Closed				Action closed. Refer to action 326	To be included as part of action 326 (review CT)	
323	Coonabarabran	Raw water	Documentation / Protocol	Coonabarabran WTP- Water sourced from the Pound Yard weir and bores has not been through a raw water risk assessment process for each separate source (it has been assessed as a combined source). A risk assessment of each source needs to be undertaken and any changes documented in the Drinking Water Management Plan	ORANA	WarrumSCMa	meetings pre October 2017	r17.6	Oct-2017	High	Manager Warrumbungle Water, Supervisor Treatment, Tech Officer	24-Jul-20		31-Mar-21		Closed				All the raw water from the bores has been tested (some radiological results outstanding). To be included as part of risk assessments (Hunter H20 NSW Health Project) 28/2/20 - Radiological test undertaken (bores) 24/7/20: needs to be done as part of RWQ assurance program; updated risk assessment for individual systems still	Risk assessment to include Pound Yard weir and bores	
324	Baradine	Disinfection	Documentation / Protocol	NSW Health to review the report on Baradine that recommended a chlorine residual of 4mg/L or otherwise the issuing of a boil water alert and provide advice to Council (review in conjunction with the CCT calculation).	ORANA	WarrumSCMa	meetings pre October 2017	r17.6	Oct-2017	High	NSW Health	27-Aug-19				Closed				Closed, covered by action 46		
325	Baradine	Disinfection	Critical control point	Increase contact time for first customer (John Featherby), relocate service.			27 June 2019 Improvement Plan review meeting	A1	27-Jun	High	Supervisor Reticulation	24-Jul-20		6-Mar-20	was 30/9/19	Complete				To be undertaken with mains replacement works (take off rising main) 13/12/19: Works are being undertaken currently 28/2/20: Still in progress		
326	All	Disinfection	Critical control point	Review CT for all systems			27 June 2019 Improvement Plan review meeting	A2	27-Jun	High	Manager Warrumbungle Water; Supervisor Treatment; Technical	28-Feb-20		13-Mar-20		In progress				Refer to related actions 44, 46, 51, 60, 262, 309, 322 27/9/19: engaged CWT to review CTs 13/12/19: CWT report to be reviewed 28/2/20: Report still to be reviewed. To be reviewed at next operational meeting.	Review CWT report and revise chlorination CCPs lower critical limit	
327	Binnaway	Filtration		Investigate filter outlet valve replacement (spare valve sitting on site)			27 June 2019 Improvement Plan review meeting	A3	27-Jun	Low	Supervisor Treatment	24-Apr-20		30-Jun-20	was 30/9/19	In progress				Not yet installed. 24/4/20: In progress (wiring done)	To be included as treatment plant upgrades	
328	All	Instrumentation		Process monitoring, automation and instrumentation project. *Council should strongly consider investing in online monitoring at all CCPs (A124& A258) *Consider implementing online monitoring of critical water quality parameters including (A212): · Raw water pH · Raw water turbidity · Filtered water turbidity · Treated chlorine residual *Online interlocks for pH and turbidity on outlet for filters (A54) ** Consider online turbidity meter with interlocks at BWY, BDN Consider interlocks for meters at CBN and MDN (A169) *CBN - Install a second turbidity meter on the outlet of filter 2 and reconfigure the existing turbidity meter to monitor filter 1.(A130) *CBN_Install continuous online chlorine meter to ensure continual effective disinfection/control of chlorination CCP.(A126) *CBN-Connect scales for chlorine gas cylinders to SCADA. (part A165)			27 June 2019 Improvement Plan review meeting (Compilation of actions)	A4	27-Jun	Very high	Manager Warrumbungle Water	24-Jul-20		31-Aug-20	Interim	In progress				Funding granted from Safe and Secure for scoping study of automation. Covers action 212 13/12/19: Consultant engaged and is coming on site next week 13/12/19: PLC are needed to install online analysers 28/2/20: Teleconference workshop in December 2019. A number of actions have been included under this action (A 54, 124, 126, 258, 258, 165) Coonabarabran - Dual turbidity meters to be installed and replacement of PLC. PLC has been ordered. H20 to install individual filter analyser (only currently on one filter) 24/4/20 Quote received from Hunter H20 for filter media replacement. Consultant has submitted. Have had meeting with Consultant on progress this week. Consultant to submit further information needed to progress. 27/4/20: received automation audit report, need to review (CW, AM) to finalise; future funding for next steps of concept design and installation/construction uncertain; PLC in CBN being installed, BWY ordered; BDN/BWY online chlorine analysers ordered; old online CBN NTU meter being moved	Review audit report from consultant	
329	Binnaway	Disinfection	Major works	Chlorine room upgrade			27 June 2019 Improvement Plan review meeting	A5	27-Jun	High	Supervisor Treatment; Project Engineer; Manager Warrumbungle Water	24-Jul-20	19/20	25-Nov-20		In progress				Quotes received, to include chlorine room upgrade 13/12/19: Have received quotes, sizing to be confirmed. HunterH20 audit to be undertaken next week, HunterH20 to confirm requirements 28/2/20 Quotes to undertake work are being reviewed 24/7/20: New chlorine room scales	To be included as treatment plant upgrades	
330	Binnaway	Sedimentation	Major works on Lagoons	Investigate restoring bank integrity of sedimentation lagoons (e.g. relining)			30 July 2019 Improvement Plan review meeting	A6	27-Jun	High	Supervisor Treatment	24-Jul-20		20-Jan-21	interim	In progress				Requested advice from HunterH20 27/9/19: asked CWT for advice, who provided advice - next stage: ? (contractor to give price for realigning) 28/2/20: Further investigation needed 24/7/20: Capital item in FY 20/21 (relining WTP lagoon -	Review previous advice and consider options	

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019;	Short term actions	Resource requirements	
331	ALL	Reservoirs	Document	Council needs to develop reservoir SOP to inspect reservoir. Specific to individual reservoir requirements			27 June 2019 Improvement Plan review meeting	A7	27-Jun	High	Manager Warrumbungle Water	28-Feb-20		31-Mar-20		Closed				13/12/19: Engaged WEARS to undertake this work 28/20/20: Action closed as covered by new action 343	Follow up with WEARS	Project management resource needed	
332	All	Fluoridation		Replace fluoridation systems and staff training			27 June 2019 Improvement Plan review meeting	A8	27-Jun	High	Manager Warrumbungle Water	24-Apr-20	19/20	31-Dec-20		Closed				13/12/19: Confirmed to be undertaken as part of Hunter H2O NSW Health project. 28/2/20: Internal meeting today with Health on design. Scheduled a workshop in March to present design		Consultant (NSW Health)	
333	All	Reservoirs		WHS upgrades and fencing of reservoirs, circular 18			27 June 2019 Improvement Plan review meeting	A9	27-Jun	High	Manager Warrumbungle Water, Supervisor Treatment	24-Jul-20	19/20	30-Jun-21		Closed				Funding FY19/20 13/12/2019: Circular 18 not yet submitted. 6 reservoirs still to be inspected, difficulties in getting Aqualift to undertake inspection. To get WEARS to undertake inspections/cleans for remaining reservoirs.	To arrange quote to get WEARS to undertake reservoir inspections/cleans for remaining 6 reservoirs.	Project management resource needed	
334	All	DWMS		Review and update DWMS *Develop, document and implement a process for reviewing formal requirements every 12 months or where there are any changes to Council's activities or formal requirements (A4) * Formally document and communicate roles and responsibilities of staff relating to management of drinking water quality. (A6) * Develop a regular review process to update the list of stakeholders. Ensure contact details are current and all relevant parties are involved in engagement processes.(A7) *Develop appropriate mechanisms for stakeholder commitment and involvement. Document the planned approach including partnership agreements or Memorandum of Understanding (MoU). (A8) * Describe process for document control for all DWMS documentation (i.e. ensure the currency, accessibility and appropriate review DWMS documents).(A267) * Update details for existing documentation in the DWMS document register.(A269) * Develop internal audit procedures and schedules appropriate to functionality of council and the water supply systems.(A277) * Develop and implement a process (including a schedule) for senior executive review of the effectiveness of the management system. The			27 June 2019 Improvement Plan review meeting (Compilation of actions)	A10	27-Jun	High	Manager Warrumbungle Water	24-Jul-20		30-Jun-20		Not started					External project 13/12/19: Consultant has provided proposal to review and update DWMS 28/2/20: To update follow the risk assessment review (A20)	Review proposal to review and update DWMS	Consultant
335	Coonabarabran	Disinfection		Review location and replace safety shower and eyewash for chlorine room			30 July 2019 Improvement Plan review meeting	A11	27-Jun	High	Supervisor Treatment	24-Jul-20		next week		In progress				Met with safety officer to review location and determine number of safety showers. 13/12/19: Shower and eyewash purchase, waiting to install 28/02/2020: to be installed by 6 March 24/7/20: landing still do and then to install eyewash			
336	All			Develop a process to regularly monitor and test safety showers and eye washes, include developing a register			27 June 2019 Improvement Plan review meeting	A12	27-Jun	High	Technical Officer	24-Jul-20		31-Dec-20		In progress				27/09/19: SS prepared draft checklist (16/08/19); locations need to be added; created carbon copy book/record documentation for each site (1xDDO sewer, 1xDDO water; 1xCLH water, 1xCLH sewer; 1xMDN water; 1xBWY water; 1xCBN sewer, 1xCBN water; 1xBDN water, 1xBDN sewer?) - check with supervisors what is practical 13/12/19: SS to add remaining locations and check with Supervisors	SS to add remaining locations and check with Supervisors	JG add in manual	
337	All			Ensure appropriate confined space signage is in place			27 June 2019 Improvement Plan review meeting	A13	27-Jun	High	Supervisor Treatment	24-Jul-20		31-Aug-20		In progress				Consultant to be engaged to develop register: 27/9/19: consultant cannot start before mid December 13/12/19: Consultant scheduled for mid Jan 2020 28/2/20 Consultant is preparing confined space register. Signage to be purchased and installed following development of register.			
338	Dunedoo	Reservoirs		Replace Rhodes Street reservoir roofs (reservoir rehabilitation project)			27 June 2019 Improvement Plan review meeting	A14	27-Jun	High	Manager Warrumbungle Water; Supervisor	24-Jul-20	19/20	8-Apr-21		Closed				27/9/19: waiting on WEARS quote; need to provide them design of Bullinda St roof 13/12/19: WEARS have provided estimate 28/20/20: Final design needed to confirm costing			
339	All			Develop system wide SOPs * Formally document any procedure related to existing control measures identified in the risk assessment that are not currently documented. Involve relevant staff in the development of these procedures.(A85 & 103) * Compile all SOPs into an operations manual (A86) Develop SOPs for: * Laboratory water quality sampling and testing (A131) * Scheduled maintenance tasks (A131) * Daily rounds (A131) * Plant operations (A131)batching and dosing (A104) * filter maintenance (A105) * distribution failures such as main breaks, sufficient flushing, cleaning of tools (A108) notification procedure for mains breaks (A109), closing household property meters prior to recommissioning mains (A110) * Monitor the sedimentation ponds daily for contamination sources such as			30 July 2019 Improvement Plan review meeting	A15	Jul-2019	High	Manager Warrumbungle Water; Supervisors	24-Jul-20		28-Feb-20		In progress				Refer to related actions 85, 86,103,104, 105, 107, 108, 109, 110, 131, 103, 216 27/9/19 & 13/12/19: supervisors to identify which other SOPs are required once we receive the ones from HH2O - then get quote from them to develop those/the rest 28/2/20 - Staff meeting scheduled for 9 March 20, Supervisors still to identify SOPs required 24/7/20: asdf	Compile existing SWMS Compile existing SOPs Develop list of required SOPs (including those to be developed by Hunter H2O). Include priorities and timeframes to be developed. Staff meeting to be used to discuss required SOP/SWMS	Consultant	
340	All	Document		That WSC investigate and implement a formalised preventative maintenance program for all the WTP, reticulation and reservoir assets. Including maintenance schedules (Action 168 and 172)	4.4	Equipment Capability and Maintenance	30 July 2019 Improvement Plan review meeting (compilation of actions)	A16	Jul-2019	Medium	Manager Warrumbungle Water; Supervisor Treatment	24-Apr-20		TBC	confirm with HH2O	In progress				Operation and maintenance schedules to be prepared by HunterH2O as part of NSW Health DWMS project. 13/12/19: Confirmed that maintenance schedules for WTP are to be undertaken as part of Hunter H2O NSW Health project. Will follow fluoridation project.	Confirm with HH2O project timeline Preventative maintenance program to for reticulation and	Consultant (NSW Health)	

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements	
341	All	All	Document Protocol	Develop an Emergency Response Plan (ERP)/Incident Response Plans (IRPs), including: *Review and finalise ERP in DWMS Implementation Report (2016)(A232) * Establish a rapid communication system to deal with unexpected events (A138 & 223) * Train relevant staff in these procedures (rapid communication incident response) and maintain a record of training. (A139) *Define communication protocols with the involvement of relevant agencies and include in the protocols a contact list of relevant agencies and businesses and their relevant key people.(A225) * Identify an appropriate person to handle all incident and emergency communications and ensure they are appropriately trained (A228) * Develop a process for documenting and reporting of an incident or emergency.(A235) *Employees should be trained and protocols regularly tested in the emergency response plans. The requirement for this should be included in the ERP.(A236) *Develop a process for investigation following incidents and emergencies and document this process. Include in this process a mechanism for revision of any emergency protocols, where an investigation demonstrates it is required.(A234) * Identify possible water quality related incidents and emergency scenarios (the risk assessment should be used as a basis) and document these potential scenarios in an Incident and Emergency Response Plan. Document procedures and response plans to address these incidents (can refer to guideline protocols from NSW Health as provided in the DWMS). Add to the ERP particular processes that are required to address			Feb-2020	Feb-2020	Feb-2020	High	Manager Warrumbungle Water	24-Jul-20			31-Dec-20		In progress				28/2/20: Confirmed that development of ERP is to be undertaken as part of Hunter H2O NSW Health project. Actions 8, 138, 139, 223, 225, 228, 232, 233, 234, 235 closed and are now covered under this action. Progress delayed (prioritised filter inspection) 24/7/20: added actions 139, 236 and 342 to this item; Also refer to Action 224/229 (dialysis list/notification procedure, low priority)		
342				Undertake an exercise of the incident response plan with PHU following finalisation of ERP (A232)					Feb-2020	High	Manager Warrumbungle Water	24-Jul-20		30-Jun-20		Closed				28/2/20: New action created, to be undertaken following completion of 341 (ERP)			
343	All			Development of document to undertake regular reservoir inspections: *develop reservoir SOP (specific to individual reservoir requirements(A334 & 107) *develop reservoir inspection checklists for the operators (A310) *Train operators in reservoir inspections (A310)			Feb-2020	Feb-2020	28-Feb-20	High	Manager Warrumbungle Water	24-Jul-20		31-Dec-20		In progress				28/2/20: New action created to compile a number of related actions (A334, 107, 310, 273, 84) Visuals inspections are currently recorded in diaries. Engaging contractor (WEARS) to develop reservoir integrity checklist to undertake inspections.	Follow up with WEARS	Project management resource needed	
344				Review and respond to NSW Health cryptosporidium risk model letter			April 2020	April 2020	April 2020	High	Manager Warrumbungle Water; Supervisor Treatment; Technical	24-Jul-20		30-May-20		Complete				24/4/2020: Letter received by NSW Health 20 December 2019, request still to be reviewed and responded to	Internal to meeting to complete		
345	Mendooran			Mendooran water supply modification upgrade. To include: *Consider a sedimentation stage with long residence times prior to returning the wash water to the inlet works. This may be achieved through installing baffles in the lagoon to reduce short circuiting (A82) *Investigate pH increase between raw and settled water (A87) *Consider switching to chlorine gas disinfection (A88) * Investigate installation of chlorine mixer for batching or replacement with chlorine gas (A171) *Consider insulating the chemical storage shed to lesson chlorine degradation.(A147) *Re-configure potassium permanganate dosing arrangement to allow 5 min contact with raw water prior to addition of PACl. (A178) *Within the new package of works planned for this plant it is recommended that a new set of P&IDs be created and the current plant along with upgrades go through the HAZOP process. (A291) *Questions were also raised on the Mendooran sedimentation lagoons and short circuiting and increased risk of slug return of backwash water.(A316) *A recirculation/rechlorination system should be considered to maintain a set concentration of free chlorine throughout the reservoirs. Vermin/bird proofing to be made permanent, access covers bought up to standard, overflow pipes made vermin proof Clean up of the site to remove cut vegetation is required as well as trimming back overhanging trees if needed. (A152)	4.4	Equipment Capability & Maintenance	2020 Review meeting (compiled action)	April 2020	April-2020	Very high	Manager Warrumbungle Water	24-Jul-20			31-Oct-20	Interim (finish concept design)	In progress				24/4/20: New action created to compile a number of related actions (A82, 87, 88, 147, 171). Priority ranked Very High, due to highest rank from compiled options. Consultant has been engaged to undertake concept design for Mendooran water supply modification upgrade project. Consultant has submitted documentation (site constraint and design report). Have had meeting with Consultant on progress this week. Consultant to submit further information needed to progress. Issue relating to pH has been considered by Consultant (CWT), probably due to algae. Preliminary hazard assessment included in current engagement, scheduled for 14 May 2020. Concept design workshop to be held in following with to hazard assessment. Not at stage for HAZOP. Have engaged with DPIE on funding options. Have not yet been advised if funding has been allocated. 24/7/20: concept design workshop held on 22/7/20; final draft received; progressing with cost estimates now; will progress with Tech Spec once DPIE endorsed concept design [CW to forward to DPIE = CWT to follow up with them re S60]; pH increase raw - settled water to be addressed by future clarifier vs sedimentation lagoons; chlorine mixing addressed by change to gas (currently still mixed with fire hose); future funding for construction uncertain however MDN WQ scored high risk rating of 5 therefore potentially eligible - awaiting advice on any funding	Trial: measure pH after aeration/cascade reactor to see if/how different to raw water pH	
346	Coonabarabran	Fluoridation works	Minor	Fluoridation upgrades: *Replace fluoridation systems and staff training (A332) *CBN - Analyse scale forming in fluoride system and on dosing spear. (A149) *CBN - Check service water for fluoride system is within required quality limits and softener in working effectively. (A166) *CBN - Modify fluoride saturator outlet pipework. (A167)	4.4	Equipment Capability & Maintenance	2020 Review meeting (compiled action)	April 2020	Apr-2020	Low	Manager Warrumbungle Water	24-Apr-20			30-Jun-20		In progress				13/12/19: Confirmed to be undertaken as part of Hunter H2O NSW Health project. 28/2/20: Internal meeting today with Health on design. Scheduled a workshop in March to present design 24/4/20: Compilation of actions 149, 166 167, 173 and 332 Within HunterH2O project. Project is progressing. Priority changed to LOW	To be included as part of task 4 Hunter H2O NSW Health project	
347	All	Raw water	Monitoring	Review raw water quality assurance plan to ensure it includes the following: *Monitor raw water organics and nutrient loading.(A120) * Consider instigating a pesticide monitoring program (A253) *Monitoring of ALL WSC bores be increased which includes:(A287) <input type="checkbox"/> Turbidity <input type="checkbox"/> pH <input type="checkbox"/> Microbiological <input type="checkbox"/> Temperature <input type="checkbox"/> Pesticides <input type="checkbox"/> Heavy Metals <input type="checkbox"/> Radiological <input type="checkbox"/> Fluoride *Coolah has a new bore "Back Bore" which is located 50m upstream of a			April 2020	April 2020	24-Apr-20	Medium	Technical Officer	24-Apr-20			29-May-20		In progress				13/12/19: Can confirm pesticides are monitored as part of raw water assurance program 24/4/20: Raw water quality assurance program review still to be undertaken Scott to review record of test results for "back bore" records	Review raw water assurance program against this requirement	

No	Location	Process	Category	Action	ADWG No	ADWG Element	Source	Haz ID / Source	Date added	Priority	Action Owner	Date reviewed	Funding	Due date	Due date notes	Status	Comments	Comments 29/08/18	Comments 1/3/19	Comments 27/6/19 & 30/7/2019 & 27/8/2019; 27/09/2019; 13/12/19; 28/2/20; 24/04/2020	Short term actions	Resource requirements
348	All	Information Systems	Operations	Routinely (daily) measure the daily chemical usage.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	BIN004, BUG002, COH002, DUN003, KEN002,	2014 (Action split	Low	Supervisor Treatment	24-Apr-20	TBC			Prioritised under automation scoping project	Not started			24/4/20: Chemical dose rate being calculated. Cannot currently measure daily chemical usage. Ability to enable chemical usage included as part of automation scoping study recommendations. Additional equipment needed.	Chemical usage equipment required, dependent on priorities in Hunter H2O scoping study automation project	
349	All	Information Systems	Operations	Install a calibration tube to allow instantaneous chemical dose rates to be measured.	10.1	Management of Documentation and Records	Hunter H2O Audit 2014	BIN004, BUG002, COH002, DUN003,	2014 (Action split	Medium	Supervisor Treatment	24-Apr-20		30-May-20			In progress			24/4/20: Action 270 split MDN calibration tube still needs cleaning	MDN calibration tube still needs cleaning	
350	Baradine	Clarification/Filtration	Major works	*Install bunds around the chemical dosing systems (to prevent run-off into clear water tank). (A68) *Reduce CCP limits for NTU and initiate BWs based on WQ (A78) *Install online NTU meters for filtration (and sedimentation after/during clarifier upgrade). (A127) *Identify and implement and appropriate repair or upgrade of the clarifier (A192)			DWMS Improvement Plan Workshop July 2020		Jul-2020	High	Manager Warrumbungle Water, Supervisor Treatment	24-Jul-20		30-Jun-21			In progress			24/7/20: combining Action items 68, 78, 127, 192; comment on A68: Bund installation waiting on recommendations for WTP upgrades/replacements (related to action 78); installation of bund + sump required in chem dosing area (to put off alum tank bund); installation of self-banded soda ash tank still outstanding	Project management resource needed for clarifier and filter replacement	
351	All	Documentation / Protocol	Update Risk Assessment	* The hazard identification and risk assessment should be internally reviewed 12 months. Every five years (or upon any significant changes to any of the water supply systems) Council should undertake a comprehensive review. The review process and records of the outcomes of these reviews should be documented. (A20) * The identification and evaluation of preventive measures should be internally reviewed 12 months. Every five years (or upon any significant changes to any of the water supply systems) Council should undertake a comprehensive review. The review should also consider whether existing control measures are being undertaken, their effectiveness and whether they are appropriately documented and formalised. The review process and records of the outcomes of these reviews should be documented. (A39) * Coonabarabran WTP- Water sourced from the Pound Yard weir and			DWMS Improvement Plan Workshop July 2020		Jul-2020	Medium	Manager Warrumbungle Water	24-Jul-20		31-Mar-21			In progress			24/7/20: combining Actions 20, 39, 323 Review of risk assessment to be undertaken as part of NSW Health project (HH20); Pound Yard weir and bores to be included. RWQ assurance program and procedure has been developed	Consultant (NSW Health)	
352	All	Reservoirs	Major works	Reservoir upgrades and bore integrity re-establishment Shire wide: * WHS upgrades and fencing of reservoirs, circular 18 (A333) * DDO: Replace Rhodes Street reservoir roofs (reservoir rehabilitation project). (A338) * BUG/KBI/BDN: Bore investigations (integrity, capping, geology, exclusion zones - fencing). (A48) * BUG: Ensure the water tank support structure integrity is checked and repaired as required Install a fall arrest or ladder cage to reduce the chance of a fall when accessing the reservoir			DWMS Improvement Plan Workshop July 2020		Jul-2020	High	Manager Water, Supervisor Treatment	24-Jul-20		30-Jun-21			In progress			24/7/20: combined A 34, 48, 333, 338 A34: do similar arrangement to KBI (\$20k) A48: fencing BUG see item 34; assume no (updated) septic tank register or mgt system within Council; bore integrity covered as part of reservoir upgrade project - WEARS to provide quotes; OWUA project: need update from OWUA (issue PO for our contribution)		
199a	Baradine	Safety/Signage	Minor works	Install appropriate signage on the chemical dosing systems (tanks or walls adjacent to tanks) showing the name, volume, UN number, classification and hazards of the dosing systems	4.5	Materials and Chemicals	Hunter H2O Audit 2014	BAR009, BAR012	2014	High	Supervisor Treatment; Technical Officer	24-Jul-20		31/01/2020	Interim was 31/08/19	Complete	- Chemical signage on the Soda Ash and PACL dosing systems is not installed on either the dosing systems or access to the compound - The dosing tanks and equipment are not banded and any chemical spills would not			Investigating to confirm requirements (against safety requirements) 27/9/19: AM check BDN for signage (PACI needed) and SDSs 13/12/19: Supervisor to progress 28/2/20: Still to progress 24/7/20: laminated sheets installed (chem pipes to be painted)		
199b	Baradine	Safety/Signage	Minor works	Install an appropriate bund around the dosing tank and equipment. The volume of the must exceed the volume of the chemical dosing tank	4.5	Materials and Chemicals	Hunter H2O Audit 2014	BAR009, BAR012		High	Supervisor North	13-Dec-19	19/20	30-May-20		Closed				13/12/19: Dependent on outcomes of review of need for plant upgrade/replacement		
40a	BDN	Catchment & Abstraction	Minor works	Concrete capping of bores	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Supervisor Treatment	24-Jul-20		31-Jan-20	was 30/9/19 (new 15/10/19 DDO)	Complete	DDO bore has been sealed; BDN being capped; Note: no concrete was used to cap			Baradine to be capped (ID 4 of project plan) Other bores have already been capped/covered. 13/12/19 - contractor has been engaged to cap bore at Baradine 28/2/20: Works still to be undertaken. Oriana project to review		
40b	Dunedoo	Catchment & Abstraction	Minor works	Sealing well at Dunedoo	3.1	Preventive Measures and Multiple Barriers	Risk assessment	1.03	Mar-2015	High	Supervisor Treatment	24-Jul-20		31-Oct-20	Interim (quote/confirmation)	In progress				13/12/19 - Engage WEARS to seal well 28/2/20: Final design needed to confirm costing 24/7/20: AM to seek quotes/confirmation from WEARS re sealing		