

Drinking Water Quality Management Plan Report

North Queensland Bulk Ports (NQBP)

SPID: 548

Financial Year 2018/2019

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

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04/12/2019

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1 Introduction

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

The report assists the Regulator to determine whether the approved DWQMP and any approval conditions have been complied with and provides a mechanism for providers to report publicly on their performance in managing drinking water quality. Specifically, it covers:

- The activities undertaken over the financial year in operating our drinking water service;
- Drinking water quality summary; and
- Summary of our performance in implementing our approved DWQMP.

This template has been prepared in accordance with the *Drinking Water Quality Management Plan Report Template and Guidance Note* published by the Department of Natural Resources, Mines and Energy accessible at www.dnrme.qld.gov.au.

2 Summary of scheme/s operated

The details of the scheme to which this plan applies, and the corresponding details of connections, and current and future demands, are provided within the DWQMP. Note that as NQBP does not have any residential customers, population figures have not been modelled and are not included in this report.

Results of network modelling, presented in NQBP's Port of Mackay Utilities Water Asset Management Plan (AMP) 2018 shows the network average day (AD) demand as approximately 534 KL/day, the maximum day (MD) demand as 1,911 KL/day (6.1 and 22 L/s equivalent continuous flow rate respectively). The maximum hour (MH) demand was assessed as a rate of 44.5 L/s. According to the Water AMP, future demand over the next 25 years is expected to be driven mostly by land holdings, with maritime demand expected to remain relatively constant.

The Port of Mackay sources water from the Mackay Regional Council (MRC) distribution network. NQBP does not implement any water treatment within its DWQMP.

Table 1 – Summary of schemes

	<i>Water Source</i>	<i>Treatment processes</i>	<i>Treatment capacity</i>	<i>Towns supplied</i>
Port of Mackay	MRC	Nil – Treated by MRC	Nil	Port of Mackay tenants, approximately 122 connections

3 DWQMP implementation

The actions undertaken to implement the DWQMP are summarised below.

During the recent period NQBP continued to implement the DWQMP by:

- Undertaking internal training on the DWQMP;
- Undertaking a Risk Assessment Review;
- Undertaking an external audit of the DWQMP in accordance with the *Water Supply (Safety and Reliability) Act 2008* and the Approval Notice;
- Implementing various improvement items contained within the DWQMP improvement plan;
- Undertaking a detailed review of the plan and incorporating relevant updates and changes relating to multiple sections within the report; and
- Continuation of monitoring water quality within its system at five (5) locations within the Port of Mackay. There have been no changes made to the monitoring program.

The actions undertaken to implement the risk management improvement program are discussed in Table 2. Note, action items marked as complete within the previous years annual report have not been included within the table below.

Table 2 – Risk management improvement program implementation status

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
02	1.2 Regulatory and Formal Requirements	Develop formal Bulk Water Supply Agreement between MRC and NQBP. Ensure that this specifies water quality, a statement such as the following is recommended: "MRC shall supply water that meets the latest Australian Drinking Water Guidelines".	30/06/2019	Draft Deed complete; however, not yet agreed between MRC and NQBP. Bulk Water Supply Agreement to be updated to include additional bulk water supply issues such as flow rates, availability, fees, head charges etc.	31/03/2020	Principal Asset Manager
04	2.1 Water Supply and System Analysis	Continue improvement of GIS. Improvement measure shall be identification and positioning of all water supply pipeline components.	Task is ongoing. 30/06/2019	Reliability of data set improved through increased control around Permit to Dig and retrieval of As-Constructed drawings from close-out of NQBP Projects which interface with the water network. All available desktop-based data has been incorporated within the GIS system. On-site inspection and verification/audit commenced. ERP Project in progress.	Task is ongoing. 30/06/2020	GIS Officer
10	3.1 Preventative measures and multiple barriers	Review planning application approval process to ensure that it covers water quality management.	01/03/2019	Planning department confirmed that the requirement for Backflow Protection Devices will be included within the next Port Development Guidelines update. Assessment report to be updated to include water quality management.	31/03/2020	Port Engineer – Mackay
11	3.2 Critical control points	Investigate options for online monitoring of bulk water supply at handover point.	30/06/2019	Pending Bulk Water Supply Agreement.	31/03/2020	Principal Asset Manager
12	3.2 Critical control points	Consider options for dealing with non-conforming water received at handover point	30/06/2019	Pending Bulk Water Supply Agreement.	31/03/2020	Principal Asset Manager
23	6.2 Incident and emergency response protocols	Adopt and integrate Drinking Water Incident and Emergency Plan and associated Drinking Water Incident Response Procedures.	Underway 31/03/2019	Include DWIEMP and DWIRP as a sub-plan to the NQBP Emergency Management Plan. The Business Continuity Plan and Emergency Management Plan are in different stages of completion. Port Engineer to liaise with Emergency Manager to close this out.	Underway 30/06/2020	Port Engineer – Mackay
24	6.2 Incident and emergency	Align DWEMP and DWIRP's with Emergency and Business Continuity Manual.	Underway 31/03/2019	This will be completed during the review of NQBP's Emergency Response Plan (Business Continuity Manual).	Underway 30/06/2020	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
	response protocols					
25	7.2 Employee training	Develop list of approved contractors.	Underway 30/06/2019	Preferred providers are understood within the engineering and maintenance group for minor works. For major works, a full tender evaluation is undertaken as standard practice to ensure that the selected contractor has the appropriate skills to undertake the works.	Complete	Port Engineer – Mackay
26	7.2 Employee training	Develop list of approved suppliers.	Underway 30/06/2019	Preferred suppliers are understood within the engineering and maintenance group for minor works. For major works, a full tender evaluation is undertaken as standard practice to ensure that the selected contractor has the appropriate skills to undertake the works.	Complete	Port Engineer – Mackay
28	8.1 Community Consultation	Encourage tenants and staff to report suspicious activity - highlight risks to THEIR drinking water.	Underway. 31/03/2019	Encourage tenants and staff to report suspicious activity - highlight risks to THEIR drinking water. DWQMP training undertaken with appropriate staff members. Wording for bulletin/newsletter prepared and provided to External Affairs for notification to tenants.	Complete	Port Engineer – Mackay
36	2.2 Assessment of water quality data	Purchase hand held testing instrument and undertake additional operational monitoring of free chlorine within the network. Update MEX with Preventative Maintenance task associated with this.	Underway	Colorimeter purchased to undertake additional operational monitoring of free chlorine within the network. PM schedule to be updated.	Underway 31/12/2019	Port Engineer – Mackay
37	1.3 Engaging Stakeholders	Update DWQMP and appended Stakeholder Register to include tenants and shipping customers as stakeholders	30/09/2019	Stakeholder List updated within DWQMP Rev 3.	Complete	Port Engineer – Mackay
38	1.3 Engaging Stakeholders	Update DWQMP and appended Stakeholder Register to include users of bubblers in the public park outside the security fence as stakeholders	30/09/2019	Stakeholder List updated within DWQMP Rev 3.	Complete	Port Engineer – Mackay
39	7.1 Employee Awareness and Involvement	Ensure that the Board members are aware of their responsibilities for drinking water quality management and particularly the DWQMP.	30/09/2019	DWQMP Refresher Training was attended by General Manager Engineering & Development. Drinking water quality policy formally reviewed with all NQBP policy's.	Complete	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
40-44	1.2 Regulatory and Formal Requirements	Bulk Water Supply Agreement inclusions	31/12/2019	Pending Bulk Water Supply Agreement.	31/03/2020	Principal Asset Manager
45	1.2 Regulatory and Formal Requirements	Check responsibilities (Water Supply (Safety and Reliability) Act 2008) for use of alternative water sources to provide drinking water supply e.g. rainwater and from water carters.	31/12/2019	Water Supply (Safety and Reliability) Act 2008 includes "substituting one water resource for another" as part of demand management. Refer Clause 41 Restricting water supply.	Closed	Port Engineer – Mackay
46	7.1 Employee awareness and involvement	Consider requiring all contractors etc to have an 'Aqua-Card' (issued by Queensland Water Directorate) for drinking water quality awareness.	31/10/2019	Consider having course completed by plumber, apprentice and maintenance superintendent. Course cost is \$50 (incl. GST) and it is available online at https://watertraining.com.au/ .	Underway 31/12/2019	NQBP Plumber
47	9.1 Investigative studies and research monitoring	Consider setting up a joint investigation project to determine whether <i>Naegleria fowleri</i> risks are being experienced in NQBP and MRC (and also potentially Isaac Regional Council and Whitsunday Regional Council) systems and if so, what risk criteria should or could be added to the incident response levels (tiers).	22/05/2019	Considered within the risk assessment held 21/05/19 and deemed to be not required due to low risk.	Complete	Port Engineer – Mackay
48	6.2 Incident and emergency response protocols	Reference logging of incidents in RiskWare in the tier information.	22/05/2019	Requirement to log all-tier incidents into Riskware included within Section 6.2.1 of DWQMP.	Complete	Port Engineer – Mackay
49	6.2 Incident and emergency response protocols	Align tier levels with regional alert levels (levels of activation) and MRC levels to allow for common understanding of priorities.	30/06/2020	Aligned with Mackay District Disaster Management Plan	Complete	Emergency Manager
50	6.2 Incident and emergency response protocols	Update the emergency plan to reference key documents rather than having the same information in more than one place (creates issues with maintaining currency). Refer also Action #99.	20/12/2019	To be undertaken through the update and finalisation of the NQBP emergency management system.	Underway 20/12/2019	Port Engineer – Mackay
51	6.2 Incident and emergency response protocols	Consider developing a diagram to show the architecture of the incident management framework and how other systems such as the external plan and records management systems (such as RiskWare and Guardian) support the framework.	20/12/2019	To be undertaken through the update and finalisation of the NQBP emergency management system.	Underway 20/12/2019	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
52	10.1 Management of documentation and records	Add 'RiskWare' to the records section of SOPs. Refer also Action # 92.	20/12/2019	Complete	Complete	Port Engineer – Mackay
53	4.1 Operational procedures	Consider adding extra sampling (piggy-backing off the current PFAS monitoring bores), such as caffeine (as an indicator of fresh faecal contamination), for any mains that are in close proximity to old/new septic sites.	20/12/2019	Cross-connection risk from septic sites assessed at risk review workshop held on 21/05/19. Requirement for additional sampling deemed to be not required. Consideration for these additional testing parameters were considered impractical and potentially costly. Chlorine residual loses would also be an indicator of septic contamination. Total coliforms are currently part of the testing program and results are unfrequently greater than 1.	Complete	Port Engineer – Mackay
54	3.1 Preventive measures and multiple barriers	Consider mapping old/new septic against existing mains to highlight any priority areas for extra diligence for repairs/replacements.	20/12/2019	An overlay of GIS and septic maps were reviewed 22/5/19 to identify potential high-risk areas. No high-risk areas were identified for the data available to date. The mapping of mains and septic is an evolving process. Other, more practical and achievable measures are in place to mitigate the risks that would arise from cross-connections of mains. Therefore, this item has been closed out.	Complete	Port Engineer – Mackay
55	4.2 Operational monitoring	Add 'green grass' as an indicator of possible breaks and ponding of water.	30/06/2020	Included in inspection Work Order (MEX PM 238)	Complete	Port Engineer – Mackay
56	10.2 Reporting	Review MEX to ensure that all inspections are included in PMs/work orders.	30/09/2019	Refer MEX Preventative Maintenance 238 WO	Complete	Port Engineer – Mackay
57	10.1 Management of documentation and records	Update the relevant SOPs to include the relevant PM schedule.	31/12/2019	Relevant PM schedule included in all SOPs.	Complete	Port Engineer – Mackay
58	10.1 Management of documentation and records	Consider utilising the functionality in MEX to allow automation of reactive maintenance work orders based on ticking 'evidence of a leak' (or similar) in MEX PM task.	31/12/2019	MEX allows conditions to be set up via a tick box which creates a new work order. This is included in the inspection task (PM). The Standard Job PM439	Complete	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
				includes for the investigation and rectification of any identified pipework leaks.		
59	7.2 Employee training	Ensure that people use the above process including customising the automatic work order.	31/12/2019	Standard Job PM 439 includes for the investigation and rectification of identified pipework leaks. Ongoing training and support on the use of Standard Jobs within MEX is provided to relevant team members as required.	Complete	Port Engineer – Mackay
60	7.1 Employee awareness and involvement	Ensure that contractors are made aware of NQBP's requirements for any procedures, specifically Repairing a Water Main.	30-Sep-19	Standard water quality awareness paragraph has been drafted for Engineering Team to add to their Scope of Works/Technical Specification documents as appropriate. Circulated to Engineering Team.	Complete	Port Engineer – Mackay
61	4.4 Equipment capability and maintenance	WaterRA report - send report on practices around distribution system chlorination practices for repairs/replacements.	31/12/2019	This report and other useful resources gathered as part of CWT Engagement and sent to Port Engineer. Literature passed on to plumber, apprentice and maintenance superintendent for review.	Complete	Port Engineer – Mackay
62	4.5 Materials and chemicals	Consider having a procurement policy which covers requirement to ensure protection of water quality of things being purchased e.g. not using stabilised pool chlorine.	30/09/2019	Requirement for having a procurement policy considered within the risk assessment 21/05/19 and deemed not necessary. Chlorine 1% solution is used for disinfection of new pipes etc. A statement has been added in the Install New Mains SOP for approval by NQBP to ensure that the chemical used is potable-grade.	Complete	Port Engineer – Mackay
63	4.5 Materials and chemicals	Ensure that SOP covers requirement to use NQBP approved chlorine.	30/09/2019	Installing a New Main SOP updated accordingly	Complete	Port Engineer – Mackay
64	6.2 Incident and emergency response protocols	Consider joining with other organisations who have distinct networks for fire fighting (e.g. Defence) to investigate how water quality is managed (and including implications on work health and safety risks).	31/12/2019	Low priority given the nature of the system. This may be able to be closed (relevant risks R09, R10 rated low at risk review 21/05/19). There are hydrants/standpipes at the port. It is a pressurised system. This action has been considered and is not deemed necessary.	Complete	Port Engineer – Mackay
65	1.2 Regulatory and formal requirements	Make sure that any contractors include requirements for protection of drinking water quality in their SWMS.	30/09/2019	Standard water quality awareness paragraph has been drafted for Engineering Team to add to their Scope of	Complete	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
				Works/Technical Specification documents as appropriate. To be reviewed and circulated.		
66	7.2 Employee training	Make sure all contractors are aware of NQBP SOPs	30/09/2019	Standard water quality awareness paragraph has been drafted for Engineering Team to add to their Scope of Works/Technical Specification documents as appropriate. To be reviewed and circulated.	Complete	Port Engineer – Mackay
67	4.1 Operational procedures	'Use work method statement of repair' - word this better in the SOP to make it clear what is meant (participants stated that a site-specific process is usually developed depending on circumstance - ensure that it is clear that potential drinking water contamination hazards and controls for these, are spelled out).	30/09/2019	"Use work method statement of repair" in SOP has been updated to read "Repair the main according to the work method statement of repair. The work method statement shall include consideration of risks which compromise water quality."	Complete	Port Engineer – Mackay
68	4.1 Operational procedures	Consider making the 5-15 min of flushing in the SOP more stringent.	30/09/2019	A chlorine analyser is to be procured to be used in the flushing of mains. The SOP for proactive mains flushing has been updated to recommend flushing for 5 minutes (into a white bucket) followed by visual inspection and testing for chlorine residual to confirm that the line has been adequately flushed. If not, flushing for an additional 5 minutes.	Complete	NQBP Plumber
69	4.1 Operational procedures	Consider using a white bucket and running flushing water until it looks clean in the bucket (where flushing is done for aesthetic concerns)	30/09/2019	SOP updated as per above.	Complete	Port Engineer – Mackay
70	10.2 Reporting	Records of inspections/lab results are in TRIM but actions resulting from monitoring are filed in MEX and the incident is filed in RiskWare - consider including references to MEX work orders within the incident in RiskWare as a cross reference across the management systems.	30/06/2020	Reference to be added in the MEX work order to be added in RiskWare. Chlorine events are not currently recorded in RiskWare. Note, PM 526 updated to include task for recording of water quality incident in Riskware.	Complete	Port Engineer – Mackay
71	4.2 Operational monitoring	Consider adding a sample point at the flow meter at the handover point with MRC.	30/09/2019	A sample point is available at the Harbour Rd connection flowmeter handover point.	Complete	Port Engineer – Mackay
72	4.2 Operational monitoring	Update the Water Quality Monitoring SOP to include annual reporting and to reflect approval notice.	30/09/2019	SOP updated as part of CWT engagement.	Complete	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
73	10.2 Reporting	Change DWQMP annual reporting to within 120 days of the end of the financial year.	30/09/2019	DWQMP annual reporting requirements updated.	Complete	Port Engineer – Mackay
74	5.2 Consumer satisfaction	Review how customer complaints are captured at NQBP (as these are required in the annual reporting requirements).	31/12/2019	Customer complaints handled in the same way as other complaints at NQBP. Complaints recorded and managed by External Affairs with detailed recorded in a complaints register. This register can easily be checked for water quality complaints prior to completion of the annual report.	Complete	Port Engineer – Mackay
75	10.2 Reporting	Update the annual reporting format to ensure it meets regulator's requirements.	30/09/2019	NQBP 2017/18 DWQMP Annual Report was checked against the latest template (available online https://www.business.qld.gov.au/industries/mining-energy-water/water/industry-infrastructure/industry-regulation/drinking-water/annual-report). Confirmed that correct template is now being used.	Complete	Port Engineer – Mackay
76	10.2 Reporting	Issue with incorrect value in the reporting spreadsheet for total coliforms (there is no ADWG health guideline value for total coliforms - they are a system health indicator only) - review the set-up of the spreadsheet and the logic statements in the cells.	30/09/2019	WQ spreadsheet checked for errors as part of CWT engagement and comments added to spreadsheet. Total coliforms does not have an ADWG health limit and turbidity target of 5 NTU (aesthetic target) should be reviewed.	Complete	Port Engineer – Mackay
77	10.2 Reporting	Nominate someone to have responsibility for QA and approval of the annual water quality report.	30/09/2019	Annual report to be reviewed by Principal Asset Manager prior to report being submitted.	Complete	Port Engineer – Mackay
78-84	6.2 Incident and emergency response protocols	Various document update items as recommended within DT1241-05-A-REP DWQMP Training Closeout Meeting Record (CWT, August 2018)	30/09/2019	All items complete.	Complete	Port Engineer – Mackay
85	10.2 Reporting	Implement processes to ensure timeframes are met for regulatory reporting. (REC-01)	30/09/2019	Preventative Maintenance Schedule included in MEX.	Complete	Port Engineer – Mackay
86	6.2 Incident and emergency response protocols	Ensure incidents are managed in accordance with the DWIEMP and records are kept to document the actions and the results of investigations. (REC-02)	31/12/2019	Background to this recommendation: An irregular WQ result was missed. Action to prevent recurrence to be considered in DWIEMP update.	Complete	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
				Team updated on the importance of reviewing results and advising on any inconsistencies asap.		
87	1.2 Regulatory and formal requirements	Prioritise establishment of the formal contract (Mackay Water Supply Deed) for the supply of treated drinking water from MRC. (REC-03). Refer also Action #02.	31/12/2019	Pending Bulk Water Supply Agreement.	Underway 31/03/2020	Port Engineer – Mackay
88	3.1 Preventive measures and multiple barriers	Include maintenance of a chlorine residual in the drinking water network as an important preventive measure in the risk assessment. (REC-04)	30/09/2019	New risk event added in risk register (R23). Additional future controls: Agreement with MRC, chlorine monitoring, designing out dead ends.	Complete	Port Engineer – Mackay
89	4.2 Operational monitoring	Establish operational monitoring of free chlorine and establish appropriate corrective actions in response to low free chlorine results. (REC-05)	31/12/2019	Colorimeter purchased. Monitoring program to be implemented in MEX.	Underway 31/12/2019	Port Engineer – Mackay
90	4.2 Operational monitoring	Review SOPs to include testing of chlorine residual to assess if the actions has been successful in implementing the preventive measure. (REC-06)	31/12/2019	Pending completion of Action #89	Not completed 31/12/2019	Port Engineer – Mackay
91	10.2 Reporting	Consider capturing the drinking water risk assessment in the Risk Ware program to standardise risk management across the organisation. (OFI-01)	31/03/2020	Outcomes of drinking water risk assessment to be loaded into RiskWare	Underway 31/03/2020	Port Engineer – Mackay
92	2.3 Hazard identification and risk assessment	Include information about water quality risks in SOPs. (OFI-02). Refer also Action #52.	30/09/2019		Completed	Port Engineer – Mackay
93	10.1 Management of documentation and records	Include details of record keeping in the SOPs. (OFI-03)	30/09/2019	List MEX and RiskWare in SOPs	Completed	Port Engineer – Mackay
94	3.1 Preventive measures and multiple barriers	Include requirements and allocate responsibility to check lab results provided by contractors, confirming new mains have been disinfected, in the SOP. (OFI-04)	30/09/2019	Refer Action #63 for paragraph. Include plumber to supervise, verify result with plumber.	Completed	Port Engineer – Mackay
95	10.1 Management of documentation and records	Include document control and review information in SOPs. (OFI-05)	30/09/2019	SOPs updated.	Completed	Port Engineer – Mackay
96	10.1 Management of	Consider saving SOPs separately and with other relevant SOPs to make them easier to search and locate. (OFI-06)	30/09/2019	SOPs have been removed from DWQMP and separated into individual documents. They've then	Completed	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
	documentation and records			been loaded onto SharePoint and a link included in the DWQMP.		
97	4.4 Equipment capability and maintenance	Update the MEX job for undertaking pipeline inspections to align with the actions required. (OFI-07)	31/12/2019	Refer PM 238	Completed	Port Engineer – Mackay
98	6.2 Incident and emergency response protocols	Consider undertaking incident scenario testing in conjunction with MRC to test emergency protocols and lines of communication. (OFI-08)	30/06/2020	To be discussed with MRC.	Not completed 30/06/2020	Port Engineer – Mackay
99	10.1 Management of documentation and records	Consider referencing the master list of emergency contacts, kept by NQBP rather than updating the DWQMP each time the list. (OFI-09)	31/12/2019	To be undertaken through the update and finalisation of the NQBP emergency management system.	Not completed 31/12/2019	Port Engineer – Mackay
100	4.2 Operational monitoring	Consider liaising with MRC to receive relevant verification data on the bulk water supplied to NQBP. (OFI-10) Refer also Action #02.	31/12/2019	Refer also Action #02.	Underway 31/03/2020	Principal Asset Manager
101	10.2 Reporting	Consider using the MEX system to allocate and track progress of improvement plan items. (OFI-11)	31/12/2019	MEX system considered but not deemed to be appropriate. Improvement plan to be managed within the DWQMP.	Completed	Port Engineer – Mackay
102	10.1 Management of documentation and records	Consider scheduling document reviews for the DWQMP and associated documents within the MEX system. (OFI-12)	31/12/2019	Refer MEX PM 488, 513 and 514	Completed	Port Engineer – Mackay
103	4.2 Operational monitoring	Consider purchasing a hand held instrument for the measurement of free chlorine, for example to trigger flushing, and to confirm free chlorine residual at the hand over point more frequently than fortnightly. (OFI-13)	30/09/2019	Refer Action #89. Quote obtained from HACH (quote no. 10045361) as part of CWT engagement. Purchase Order issued to HACH. Awaiting delivery. PM for regular testing at dead ends to be finalised.	Completed	Port Engineer – Mackay
104	1.2 Regulatory and formal requirements	Consider including the requirement for a minimum free chlorine residual at the bulk water handover point in the drinking water supply deed. (OFI-14). Refer also Action #02.	30/09/2019	This action is marked as "complete" but has been merged with action item #106 to ensure tasks are taken out simultaneously.	Completed	Principal Asset Manager

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
105	6.1 Communication	Consider liaising with MRC to identify strategies to improve chlorine residual at the handover point. (OFI-15)	31/12/2019	Source: REC-18-186 1.0 Port of Mackay Audit Report by Viridis Consultants, Sept 2018. Improvement of chlorine residual at MRC handover point considered but not deemed necessary.	Completed	Port Engineer – Mackay
106	1.2 Regulatory and formal requirements	Enter into Bulk Water Supply Agreement between NQBP and MRC by December 2019. Consider including the requirement for a minimum free chlorine residual at the bulk water handover point in the drinking water supply deed. (OFI-14). Refer also Action #02.	31/12/2019	Refer also Action #02.	31/03/2020	Principal Asset Manager
107	4.4 Equipment capability and maintenance	Confirm, document and install as appropriate, a BPD at: 1. Each (high risk tenant) meter 2. Atom (If not BPD check for an airgap) 3. Each wharf (to install). Ensure any unregistered BPD is added to register to track asset condition and ensure tenant is undertaking routine maintenance.	30/06/2020	Audit of BPD to be undertaken. Project Brief for manager approval and then purchasing and installation planned for FY 19/20.	30/06/2020	Port Engineer – Mackay
108	6.1 Communication	Establish formal procedures to ensure MRC informs NQBP of breaches of chlorine residual at Mt Bassett register (MRC quality control point). Add this condition the to Bulk Water Supply Agreement.	31/12/2019	Include in Bulk Supply Agreement.	31/03/2020	Port Engineer – Mackay
109	4.4 Equipment capability and maintenance	Investigate directional flow devices at two fire-fighting tanks for their efficiency in preventing backflow into reticulation particularly in the event of the pipe breaks (or low pressure) in reticulation.	31/03/2020	Replacement with BPD to be considered as part of Action #107	30/06/2020	NQBP Plumber
110	7.1 Employee awareness and involvement	Consider including the requirement of the Aquacard. Refer also Action #46.	31/10/2019	Refer also Action #46. Include requirement in People Connect.	31/12/2019	NQBP Plumber
111	4.2 Operational monitoring	Once a chlorine meter is procured, establish a monitoring program to monitor loss of chlorine residual; particularly after periods of time where water has not been supplied in bulk from wharfs.	30/06/2020	Chlorine meter procured. Monitoring program to be established.	31/12/2019	Port Engineer – Mackay
112	4.4 Equipment capability and maintenance	Confirm that valves and backflow devices are covered in Asset Maintenance System - in progress	31/12/2019	Confirmed. Water AMP included in DWQMP.	Completed	Port Engineer – Mackay

ID #	Category	Improvement actions	Target date	Actions taken to date	Status and revised target date	Responsible Officer / Position
113	4.4 Equipment capability and maintenance	Install fence or barrier (e.g. bollard) around Harbour Rd connection flowmeter (subject to MRC approval).	30/06/2020	To be budgeted and approved internally. Include requirement in next AMP update.	To be completed 31/07/2020	Port Engineer – Mackay
114	4.4 Equipment capability and maintenance	Determine requirement for assigning criticality levels to equipment in AMP and/or MEX to ensure that sufficient redundancy (spares) are available in the event of a failure of critical equipment.	31/07/2020	To be reviewed in next AMP update.	To be completed 31/07/2020	Port Engineer – Mackay

4 Verification monitoring - water quality information and summary

This section discusses the compliance with the water quality criteria.

The results from the verification monitoring program have been compared against the levels of the water quality criteria specified by the Regulator in the *Water Quality and Reporting Guideline for a Drinking Water Service*. The reported statistics do include results derived from repeat samples, but do not include those from emergency or investigative samples undertaken in response to an elevated result. Verification monitoring was carried out as per the program stated within the DWQMP. Refer to Tables 3 and 4 below for relevant monitoring data.

Table 3 – Drinking water quality performance - verification monitoring – Mackay Scheme

Parameter	No. of samples required to be collected (as per the approved DWQMP)	No. of samples actually collected and tested	Water quality criteria (i.e ADWG health guideline value)	No. of non compliant samples	Comments
Free Residual Chlorine (mg/L)	65	89	>0.2, <5	8	8 samples resulted in a chlorine reading < 0.2 mg/L. Reactive flushes were undertaken when free chlorine results came back at < 0.2mg/L.
Total Chlorine (mg/L)	65	89	>0.2, <5	8	8 samples resulted in a total chlorine reading < 0.2 mg/L. A reactive flush was taken following receipt of results.
Turbidity (NTU)	65	89	<5	0	
E. Coli (MPN/100mL)	65	89	0	0	
pH	65	93	>6.5, <8.5	0	
Conductivity (µS/cm)	65	89	-	n/a	Min = 172 µS/cm Median = 255 µS/cm Avg = 251.3 µS/cm Max = 351 µS/cm
Dissolved Oxygen (% Sat)	65	89	>85	81	81 samples were below the aesthetic guideline value of 85% sat. The minimum value was 66%. Low DO consistent with MRC readings.

Parameter	No. of samples required to be collected (as per the approved DWQMP)	No. of samples actually collected and tested	Water quality criteria (i.e ADWG health guideline value)	No. of non compliant samples	Comments
Temperature (°C)	65	89	-	n/a	Min = 19.6 °C Median = 26.9 °C Avg = 26.2 °C Max = 34.6 °C
Total Coliforms (MPN/100mL)	65	89	0	2	2 samples tested on 08/01/2019 resulted in Total coliforms > 0. Non-reportable, indicator only. Min = 0 MPN/100mL Max = 4 MPN/100mL

Table 4. E. coli compliance with annual value

Drinking water scheme: Port of Mackay

Year	2018 – 2019											
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. of samples collected	11	6	7	7	7	7	7	7	6	10	7	7
No. of samples collected in which E. coli is detected (i.e. a failure)	0	0	0	0	0	0	0	0	0	0	0	0
No. of samples collected in previous 12 month period	94	95	94	94	94	94	93	90	90	88	90	90
No. of failures for previous 12 month period	0	0	0	0	0	0	0	0	0	0	0	0
% of samples that comply	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compliance with 98% annual value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

5 Incidents reported to the regulator

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

This financial year there were 0 instances where the Regulator was notified under sections 102 or 102A of the Act. There were a total of 8 instances where the Free and Total Chlorine content within the water tested was below the ADWG.

Table 5 – Incidents reported to the regulator

Incident date	Scheme / location	Parameter / issue	Preventive actions
Nil			

6 Customer complaints

This section discusses details of any complaints received about the drinking water service.

NQBP is required to report on the number of complaints, general details of complaints, and the responses undertaken.

Throughout the year no complaints were received by NQBP with respect to water quality within the Port of Mackay.

Table 6 – Example: customer complaints about water quality

Scheme	Health concern	Dirty water	Taste and odour	Other
Port of Mackay	0	0	0	0
Total	0	0	0	0

7 DWQMP review outcomes

A summary of the outcomes of the review and how issues/changes raised in the review, were actioned is provided in this section.

A risk assessment and review of the DWQMP was conducted in April 2019 and covered the time period from 01/07/18 to 31/06/19. The purpose of the review was to ensure that the DWQMP remains relevant, having regard to the operation of the drinking water service. The review was conducted by:

- Jen Annice – Port Engineer;
- Mark Berts – Plumber; and
- Jess Circosta – Senior Process Engineer, City Water Technology.

The review considered comments and recommendations from the DWQMP training session and external audit undertaken within August 2018 and September 2018 respectively.

A formal update and revision to the DWQMP was issued to the regulator via an Amendment Application for approval in September 2019.

Table 7 – DWQMP review outcomes

Review Date: April 2019

Review component	Findings	Outcomes	Status of actions	Responsible Officer / Position
Service description	Current and future demand not in alignment with revised Asset Management Plan (AMP). Water quality team, including roles and responsibilities, not in alignment with current business structure.	Current and future demand updated to align with most recent AMP. Water quality team along with roles and responsibilities to be updated to align with current business structure.	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay
Details of infrastructure	No changes	not applicable	Not applicable	Port Engineer – Mackay
Water quality catchment characteristics	New set of water quality data available for past two years.	Water quality data in DWQMP to be updated.	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay

Review component	Findings	Outcomes	Status of actions	Responsible Officer / Position
Risk assessment	Outcomes from Risk Assessment (completed 21/05/19) to be included as an updated Appendix to the DWQMP.	Risk Assessment Summary Paper and Risk Register included within Appendix 7. Resulting improvement items included within Improvement Program.	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay
Operations and maintenance procedures	Standard Operating Procedures (SOPs) require review and update to align with current practice and to include relevant Preventative Maintenance reference numbers. Training records to be included. Reporting requirements need to be updated to align with DNRME requirements.	SOPs updated as required, training records and details included. Location of SOPs included. Reporting requirements updated to align with DNRME requirements.	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay
Management of incidents and emergencies	Actions to be taken in the case of an incident to be updated to include 'logging in RiskWare for all Tier Levels.	RiskWare logging included as an action for every incident.	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay
Risk management improvement program	The Improvement Plan needs to be updated to include outcomes from the Training Workshop, External Audit and Risk Assessment. All improvement action items need to be updated to reflect current status.	DWQMP Improvement Plan updated to include outcomes from the Training Workshop, External Audit and Risk Assessment (ID 37 to 114 inclusive). All improvement action items updated to reflect current status.	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay
Service wide information management	No changes	Not applicable	Not applicable	Port Engineer – Mackay
Operational monitoring	No changes	Not applicable	Not applicable	Port Engineer – Mackay
Verification monitoring	Complaint process requires updating to align with current business practice. Reporting of results duration	Complaint process updated to align with business practice. Reporting requirements updated.	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay

Review component	Findings	Outcomes	Status of actions	Responsible Officer / Position
	to be updated in to correctly align with DNRME requirements.			
Other	<p>Document review and audit intervals need to be updated to match Decision Notice letter dated 8/3/2018</p> <p>Document review interval needs to be updated to match Decision Notice letter dated 8/3/18.</p>	<p>Document review and audit intervals updated to match Decision Notice letter dated 8/3/18 (2-yearly review, 4-yearly audit).</p> <p>Document review interval updated to match Decision Notice letter dated 8/3/18 (2-yearly review).</p>	Complete. Changes included within Rev 3 update.	Port Engineer – Mackay

8 DWQMP audit findings

The first regular audit of NQBP's DWQMP was undertaken in September 2018 through the engagement of Viridis Consultants Pty Ltd, who are Exemplar Global certified Drinking Water Quality Management System Auditors. The auditor submitted the audit report to the regulator on 24th September 2018. The purpose of the audit was to:

- Verify the accuracy of monitoring and performance data;
- Assess NQBP's compliance with its DWQMP; and
- Assess the relevance of the DWQMP in relation to the Port of Mackay drinking water service.

A summary of the auditor's findings includes:

- The data supplied within the 2016/2017 and 2015/2016 Annual Reports was accurate;
- NQBP is generally operating its drinking water service in compliance with its approved DWQMP;
- The DWQMP reflects the current circumstances of the scheme and water quality results are consistent with the outcomes of the risk assessment;
- NQBP will benefit from reviewing the identification and implementation of preventive measures and confirming implementation of the drinking water incident management plan and keeping records of incident management;
- The link between the procedures and the management of water quality risk needs to be strengthened;
- The Water Supply Deed with Mackay Regional Council (MRC) needs to be established as a priority; and
- The maintenance of chlorine residual in the water supply network is the most important preventative measure for the NQBP distribution network. This needs to be captured within the risk assessment and additional monitoring is required to quantify chlorine residual in the network regularly.

The actions undertaken to address the audit recommendations are outlined in Table 8.

Table 8 – DWQMP audit findings and status

Item	Recommendation (REC) or OFI	Action	Status of actions	Responsible Officer / Position
Implement processes to ensure timeframes are met for regulatory reporting	REC-01 – Recommendation	Included as Improvement Plan ID 85. Preventative Maintenance Schedule to be included in MEX	Complete	Port Engineer – Mackay
Ensure incidents are managed in accordance with the DWIEMP and records are kept to document the actions and the results of investigations.	REC-02 – Recommendation	Included as Improvement Plan ID 86. Action to prevent recurrence to be considered in DWIEMP update. Team to be updated on the importance of reviewing results and advising on any inconsistencies asap.	Complete	Port Engineer – Mackay
Prioritise establishment of the formal contract (Mackay Water Supply Deed) for the supply of treated drinking water from MRC.	REC-03 – Recommendation	Included as Improvement Plan ID 87. Bulk Water Supply Agreement to be implemented with MRC (also Improvement Plan Item 2).	Underway. Agreement to be finalised.	Principal Asset Manager
Include maintenance of a chlorine residual in the drinking water network as an important preventive measure in the risk assessment.	REC-04 – Recommendation	Included as Improvement Plan ID 88. New risk event to be added in risk register (R23).	Complete	Port Engineer – Mackay
Establish operational monitoring of free chlorine and establish appropriate corrective actions in response to low free chlorine results	REC-05 – Recommendation	Included as Improvement Plan ID 89. Colorimeter to be purchased. Monitoring program to be implemented in MEX.	Underway. Colorimeter purchased. Monitoring program to be implemented.	Port Engineer – Mackay
Review SOPs to include testing of chlorine residual to assess if the actions has been successful in implementing the preventive measure.	REC-06 – Recommendation	Included as Improvement Plan ID 90. Review SOPs to include testing of chlorine residual.	Underway. Pending completion of Improvement Plan item 89.	Port Engineer – Mackay
Consider capturing the drinking water risk assessment in the Risk Ware program to standardise risk management across the organisation.	OFI-01 – Opportunity for Improvement	Included as Improvement Plan ID 91. Outcomes of drinking water risk assessment to be loaded into RiskWare	Underway. To be completed.	Port Engineer – Mackay

Item	Recommendation (REC) or OFI	Action	Status of actions	Responsible Officer / Position
Include information about water quality risks in SOPs.	OFI-02 – Opportunity for Improvement	Included as Improvement Plan ID 92. Update SOPs to include water quality risks.	Completed	Port Engineer – Mackay
Include details of record keeping in the SOPs	OFI-03 – Opportunity for Improvement	Included as Improvement Plan ID 93. List MEX and RiskWare in SOPs.	Completed	Port Engineer – Mackay
Include requirements and allocate responsibility to check lab results provided by contractors, confirming new mains have been disinfected, in the SOP	OFI-04 – Opportunity for Improvement	Included as Improvement Plan ID 94. Installing a New Main SOP to be updated accordingly. Include plumber to supervise, verify result with plumber.	Completed	Port Engineer – Mackay
Include document control and review information in SOPs.	OFI-05 – Opportunity for Improvement	Included as Improvement Plan ID 95. Include document control and review information in SOPs.	Completed	Port Engineer – Mackay
Consider saving SOPs separately and with other relevant SOPs to make them easier to search and locate.	OFI-06 – Opportunity for Improvement	Included as Improvement Plan ID 96. Remove SOPs from DWQMP and separated into individual documents. Load onto SharePoint and include a link to documents within the DWQMP.	Completed	Port Engineer – Mackay
Update the MEX job for undertaking pipeline inspections to align with the actions required.	OFI-07 – Opportunity for Improvement	Included as Improvement Plan ID 97. Include PM in MEX.	Completed	Port Engineer – Mackay
Consider undertaking incident scenario testing in conjunction with MRC to test emergency protocols and lines of communication.	OFI-08 – Opportunity for Improvement	Included as Improvement Plan ID 98. To be discussed with MRC.	Not completed. Scheduled to be completed by 30/06/2020.	Port Engineer – Mackay
Consider referencing the master list of emergency contacts, kept by NQBP rather than updating the DWQMP each time the list	OFI-09 – Opportunity for Improvement	Included as Improvement Plan ID 99. To be undertaken through the update and finalisation of the NQBP emergency management system.	Not completed. Scheduled to be completed by 31/12/2019.	Port Engineer – Mackay
Consider liaising with MRC to receive relevant verification data on the bulk water supplied to NQBP.	OFI-10 – Opportunity for Improvement	Included as Improvement Plan ID 100. To be included within Bulk Water Supply Agreement.	Underway. Agreement to be finalised by 31/03/20.	Port Engineer – Mackay

Item	Recommendation (REC) or OFI	Action	Status of actions	Responsible Officer / Position
Consider using the MEX system to allocate and track progress of improvement plan items.	OFI-11 – Opportunity for Improvement	Included as Improvement Plan ID 101. Consider using the MEX system to allocate and track progress of improvement plan items.	Completed. MEX system considered but not deemed to be appropriate. Improvement plan to be managed within the DWQMP.	Port Engineer – Mackay
Consider scheduling document reviews for the DWQMP and associated documents within the MEX system.	OFI-12 – Opportunity for Improvement	Included as Improvement Plan ID 102. Schedule document reviews for the DWQMP and associated documents within the MEX system.	Completed. Included as MEX PM 488, 513 and 514.	Port Engineer – Mackay
Consider purchasing a hand held instrument for the measurement of free chlorine, for example to trigger flushing, and to confirm free chlorine residual at the hand over point more frequently than fortnightly.	OFI-13 – Opportunity for Improvement	Included as Improvement Plan ID 103. purchase a hand-held instrument for the measurement of free chlorine.	Completed	Port Engineer – Mackay
Consider including the requirement for a minimum free chlorine residual at the bulk water handover point in the drinking water supply deed.	OFI-14 – Opportunity for Improvement	Included as Improvement Plan ID 104. To be included within Bulk Water Supply Agreement.	Underway. Agreement to be finalised by 31/03/20.	Principal Asset Manager
Consider liaising with MRC to identify strategies to improve chlorine residual at the handover point.	OFI-15 – Opportunity for Improvement	Included as Improvement Plan ID 105. Consider liaising with MRC to identify strategies to improve chlorine residual at the handover point.	Completed. Improvement of chlorine residual at MRC handover point considered within risk assessment but not deemed necessary.	Port Engineer – Mackay