

DWQMP Regular Audit Report
Hinchinbrook Shire Council

April 2017



DWQMP Regular Audit Report

Hinchinbrook Shire Council

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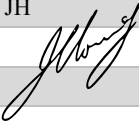
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Executive Summary

Compliance Statement

The auditor believes that Hinchinbrook Shire Council (HSC) has demonstrated a high level of compliance with the regular audit imposed by the *Water Supply (Safety and Reliability) Act 2008* during the audit period.

HSC is generally operating its drinking water service in compliance with its approved Drinking Water Quality Management Plan (DWQMP).

The audit noted one (1) major non-compliance in relation to the relevance of the plan. The Herbert River raw water source is an uncontrolled catchment and therefore has a risk of protozoa. Whilst there may be some filtration through the river bed, this is not a controlled process and there is no further treatment process to manage this risk. There are no defined monitoring protocols, critical limits or process controls to ensure that protozoa risk from this source is addressed.

The audit noted two (2) minor non-compliances in relation to implementation of preventive measures and implementation of risk management improvement program. It was identified that critical limit alarms can be changed by an operator, and there is no process for approving or tracking changes to SCADA alarms. The Risk Management Improvement Plan (RMIP) item of completion and establishment of operational procedures has not been completed.

Audit Conclusions

The audit concluded that HSC:

- provided accurate monitoring and performance data to the regulator
- generally implemented its DWQMP
- would benefit from reviewing the relevance of the plan.

The overall summary of compliance is shown in Table 1. Eleven (11) requirements were audited within the audit areas.

Table 1 Compliance Summary

Compliance Codes		Number of Findings
Compliant	C	8
Minor Non-Compliant	N	2
Major Non-Compliant	M	1

Recommendations have been provided for the minor and major non-compliances. Opportunities for improvement have also been identified, where relevant. An opportunity for improvement does not have an impact on compliance, but may contribute to process improvement and/or the DWQMP. The utility can decide whether to implement an opportunity for improvement, based on its own assessment on whether the improvement is a prudent and efficient way to achieve the intended outcomes.

Recommendations

The recommendations from the audit are as follows:

- Develop a procedure for documenting changes to SCADA alarms, that includes approval and signoff of the changes by a person in a supervisory role. Include a process to regularly review SCADA alarms to ensure they are set at the correct value.
- Progress the establishment of operational procedures, prioritise those procedures noted in the risk assessment that manage significant risks.
- Review flow diagrams to ensure that they accurately reflect the water supply system.

- Review raw water monitoring for the Herbert River supply and set targets and limits for process controls to ensure protozoa control and effectiveness of disinfection – US EPA Surface Water Treatment Rules: Unfiltered Systems).

1 Introduction

Viridis Consultants Pty Ltd (Viridis) was engaged by the Far North Queensland Regional Organisation of Councils (FNQROC), to conduct an audit of Hinchinbrook Shire Council (HSC) service provider identification number 062, to undertake the first regular (external) audit of its Drinking Water Quality Management Plan (DWQMP).

HSC sources, treats and distributes potable drinking water for its customers. The water is sourced from both surface water and ground water. HSC's local government area covers over 2,800 square kilometers and services more than 10,000 people. HSC supplies potable water within its three (3) water supply schemes, which include Ingham, Lower Herbert and Forrest Beach.

As required by the *Water Supply (Safety and Reliability) Act 2008* (the Act), HSC is operating its drinking water service under an approved DWQMP. The approval notice was reissued on 4 November 2016. HSC is required to complete the first regular audit of its approved DWQMP by 30 June 2017.

This report includes the findings and conclusions from the first regular audit of the HSC DWQMP.

1.1 Objectives

The objectives of the audit were to:

- undertake an audit of HSC's DWQMP to fulfil the requirements of the Act and approval notice
- conduct the audit in line with the *Drinking Water Quality Management Plan Review and Audit Guidelines 2013*.

1.2 Regulatory Regime

The statutory requirements for DWQMP regular audits are detailed in the Act. The relevant provisions in the Act for providing audit reports are:

- section 99(2)(c) - if the regulator approves the plan, the notice of the decision or information notice for the decision, will state that if the regulator requires audits of the approved plan – the intervals at which the audits must be conducted
- section 99(4) - the interval for regular audits will not be less than two years
- section 108(1) - the provider must arrange for regular audit reports to be prepared about the provider's plans and compliance with the plans
- section 108(2) - regular audit reports must be prepared in accordance with the notice given by the regulator under section 99
- section 108(3) states that the purpose of the regular audit report for this plan is:
 - to verify the accuracy of the monitoring and performance data provided to the regulator under the plan
 - to assess the service provider's compliance with the plan
 - to assess the relevance of the plan in relation to the provider's drinking water service.
- section 108(6) outlines that the regular audit report for this plan must be prepared by a person, other than an employee of the service provider or someone employed in operating the service provider's infrastructure, who is certified under the Drinking Water Quality Management System Auditor Certification Scheme to conduct an audit of the type to which the report relates, or has a qualification the regulator is satisfied is at least equivalent to this qualification
- section 108(6) also states that the regular audit report must be:
 - prepared in accordance with the guidelines made by the regulator about preparing regular audit reports
 - given to the regulator within 30 business days after its completion
 - made available for inspection and purchase.
- section 575 states that the provider must keep a copy of the audit report available for inspection by the public during office hours on business days at the office of the service provider.

1.3 Audit Scope

The scope of the audit was to:

- verify the accuracy of monitoring and performance data
- assess HSC's compliance with its DWQMP
- assess the relevance of the DWQMP in relation to HSC's drinking water service.

1.4 Audit Criteria

The approved amended DWQMP (revision D) and reissued approval amendment notice dated 04 November 2016.

1.5 Audit Standard

AS/NZS ISO 19011:2014 *Guidelines for Auditing Management Systems* was relied upon to ensure good auditing practices.

2 Audit Method

2.1 Auditor

Karen Pither conducted the audit. Karen is an Exemplar Global Certified Lead Auditor for Drinking Water Quality Management Systems. She is experienced in undertaking audits of drinking water schemes and has extensive knowledge of the operation and regulation of drinking water schemes.

Geraldine Terada-Bellis provided technical support in the audit preparation and report preparation.

The auditor confirms that:

- sufficient evidence has been sighted on which to base audit conclusions
- the audit findings accurately reflect the professional opinion of the auditor
- the audit findings have not been unduly influenced by the auditee and/or any of its associates.

2.2 Audit Agenda

The audit comprised of the following steps:

1. information requests to HSC, identifying necessary information and documentation required to undertake the audit
2. preparation for audit, development of audit checklist
3. on-site audit and verification, including staff interviews
4. audit report preparation.

2.3 Reference Documentation

The key reference documents and evidence relied on for the audit are identified in the detailed audit findings in Appendix A.

2.4 On-site Audit

The on-site visit was undertaken as follows:

- 20 Mar 17 – HSC, 25 Lannercost St, Ingham, opening meeting and overarching DWQMP audit
- 21 March 17 – Ingham Pump Station Water Treatment Plant, Ingham Depot Water Treatment Plant, Ingham Tower, Tokalon Tower: Onsite Verification

The opening and closing meeting participants are identified in Table 2.

Table 2 Audit Participants

Name	Position
Karen Pither	Auditor
Peter Martin	Manager of Water and Sewerage
Monica Accornero	Infrastructure Engineer
Haydn Grazioli	Technical Officer Water and Sewerage
David Lee	W&S Treatment Team Leader
Neil Fredericks	Water Treatment Plant Operator

2.5 Audit Grades

Table 3 identifies the grades used for this audit.

Table 3 Audit Grades

Compliance Codes		Definition
Compliant	C	Indicates compliance of audit findings with reference documentation.
Minor Non-Compliant	N	Does not comply, however, deficiency does not compromise the delivery of products or outcomes and does not compromise the ability to achieve defined objectives.
Major Non-Compliant	M	Does not comply. Deficiency that compromises the delivery of products or outcomes, and the ability to achieve defined objectives.

A recommendation is provided for requirements which do not comply, that is, major or minor non-compliances.

An opportunity for improvement (OFI) is identified for activities which comply but may also be improved. An opportunity for improvement does not have an impact on compliance, but may contribute to process improvement and/or the DWQMP. The utility can decide whether to implement an opportunity for improvement, based on its own assessment on whether the improvement is a prudent and efficient way to achieve the intended outcomes.

2.6 Quality Assurance Process

This audit was carried out in accordance with the Viridis Quality Manual, consistent with ISO 9001:2008. Karen Pither was the Lead Auditor for the audit and responsible for ensuring the quality of the deliverables. Quality assurance activities undertaken during the audit comprised of:

- compliance with the Viridis Quality Manual
- internal peer review of report
- document control and approval processes.

3 Audit Findings

The audit was carried out as described in Section 2. The completed audit checklist is in Appendix A, which includes the detailed findings for the audit. The findings have been summarised in the sections below.

3.1 Summary

HSC demonstrated a high level of compliance with the regular audit imposed by the *Water Supply (Safety and Reliability) Act 2008* during the audit period. The overall summary of compliance is shown in Table 4, eleven (11) requirements were audited.

Table 4 Audit Summary

Compliance Codes		Number of Findings
Compliant	C	8
Minor Non-Compliant	N	2
Major Non-Compliant	M	1

The audit concluded that HSC:

- provided accurate monitoring and performance data to the regulator
- generally implemented its DWQMP
- would benefit from reviewing the relevance of the plan, as the plan does not adequately address protozoa risk in the Herbert River raw water source.

HSC is generally operating its drinking water service in compliance with its approved Drinking Water Quality Management Plan (DWQMP).

The audit noted one (1) major non-compliance in relation to the relevance of the plan. The Herbert River raw water source is an uncontrolled catchment and therefore has a risk of protozoa. Whilst there may be some filtration through the river bed, this is not a controlled process and there is no further treatment process to manage this risk. There are no defined monitoring protocols, critical limits or process controls to ensure that protozoa risk from this source is addressed.

The audit noted two (2) minor non-compliances in relation to implementation of preventive measures and implementation of risk management improvement program. It was identified that critical limit alarms can be changed by an operator, and there is no process for approving or tracking changes to SCADA alarms. The Risk Management Improvement Plan (RMIP) item of completion and establishment of operational procedures has not been completed.

Opportunities for improvement have also been identified, where relevant, to assist with process improvements. These are further discussed in the sections that follow.

3.2 Accuracy of Monitoring and Performance Data

3.2.1 Compliance

The audit was required to *verify the accuracy of monitoring and performance data* supplied to the regulator by HSC under the plan, including data required under any provisions or conditions outlined in the approval notice.

To verify the information in the annual report, water quality data spreadsheets for *Escherichia coli* and the standard water quality analysis, were provided at audit and the data within the spreadsheets was compared with the data reported in the annual report for 2015/2016. The audit confirmed that for the data reviewed, the data in the annual report was accurate. The complaints database and details about exceedances with the water quality criteria were also reviewed and confirmed to be consistent with the data presented in the 15/16 annual report.

The audit verified that the data supplied was accurate and HSC was **compliant** with this audit area.

3.2.2 Recommendations

No recommendations have been made in relation to this audit area.

3.2.3 Opportunity for Improvement

- Consider including an option within the complaints database for recording complaints about taste and odour.

3.3 Compliance with the Plan

3.3.1 Compliance

HSC demonstrated high compliance with this audit area. The auditor assessed the following specific components for compliance with this audit area:

- *Provision and conditions in the approval notice* – HSC was **compliant** with the requirement. The DWQMP annual report for the 2014-15 financial year was prepared and submitted to DEWS, although almost a month outside the due date. An OFI was identified for this area.
- *Implementation of preventive measures* – a **minor non-compliance** was identified with this audit requirement. It was identified that a critical limit alarm had been changed by an operator, and there is no process for approving or tracking changes to SCADA alarms. A recommendation was identified for this area.
- *Implementation of operational and maintenance procedures* – HSC was found to be **compliant** with this requirement as the approved DWQMP accurately identifies that the procedures are in development. The DWQMP includes a list of draft procedures. Finalisation of the procedures is an item in the Risk Management Improvement Plan (RMIP). Draft versions of a sample of the procedures (Responding to an *E coli* detection and Water Quality Sampling) were viewed at audit. Both procedures are still in the process of being written and have not been reviewed or finalised. At audit it was discussed that it is challenging to allocate time to these procedures. OFIs were identified for this audit area.
- *Implementation of process for managing incidents and emergencies* – HSC was **compliant** for this audit requirement. Water quality exceedance records are kept through the records management system –the Enterprise Corporate Management (ECM) record keeping system. The non-compliance folder was shown at audit which included notifications made to the regulator. OFIs were identified for this area.
- *Implementation of operational and verification monitoring programs* – HSC was found to be **compliant** for this audit requirement. The SCADA monitoring described in the DWQMP was confirmed at audit, and the critical limits were reviewed. Critical limit exceedances are recorded on the daily log sheet in the comments column, however there were no exceedances to observe during the audit. The verification monitoring program is captured on a spreadsheet, showing where and when samples are to be taken. Operator Cert II and Cert III training includes taking water quality samples. OFIs were identified for this area.
- *Implementation of the risk management improvement program* – a **minor non-compliance** was identified with this audit requirement. RMIP items were discussed at audit, and it was found that the RMIP is being progressed and actions are being completed, for example, replacement of bore heads is largely completed and the Forest Beach pipeline completed. Completion and establishment of operational procedures has not been completed. A recommendation was identified for this area.
- *Maintaining records* – HSC was found to be **compliant** with this requirement. The record keeping requirements detailed in Table 5-5 were reviewed and confirmed at audit. It was noted that there is no formal process for document management, including identifying current and controlled versions, version control in general or superseding old versions. It was discussed that staff use different and old version of procedures, forms and templates. An OFI was identified for this area.

- *Undertaking regular reviews* – HSC was found to be **compliant** in this audit requirement. According to the DWQMP, a review was conducted on the 25 March 2015. Advice was sought from the Regulator regarding the requirements to amend the DWQMP. The decision was made to submit an amendment which was approved on 18 August 2015.

3.3.2 Recommendations

The following recommendations have been made in relation to this audit area:

- Develop a procedure for documenting changes to SCADA alarms, that includes approval and signoff of the changes by a person in a supervisory role. Include a process to regularly review SCADA alarms to ensure they are set at the correct value.
- Progress the establishment of operational procedures, prioritise those procedures noted in the risk assessment that manage significant risks.

3.3.3 Opportunities for Improvement

The following opportunities for improvement has been made in relation to this audit area:

- Ensure that the DWQMP annual report is submitted within the required timeframe of 120 business days from the end of the financial year.
- Document the chemical procurement, delivery and receipt process to ensure relevant risks are managed (e.g. incorrect chemical, incorrect chemical strength, sufficient chemical quantity at hand, stock rotation).
- Review the procedures for calibrating monitoring equipment to ensure that results are reliable. The process should include identification of acceptable variation between hand held and online equipment, to note where full calibration is required, rather than adjustment.
- Ensure the contractor puts calibration stickers on instruments to indicate the date of calibration and next due.
- Document the reservoir inspection and cleaning program, including frequency and records, and ensure that it is implemented.
- Formalise the performance review process to ensure training needs are identified and progressed.
- Consider establishing an incident and emergency response plan, that captures the detail in the DWQMP in a standalone document.
- Formalise record keeping processes for water quality incidents.
- Develop a training module for managing water quality incidents.
- Undertake scenario testing of incident and emergency response and communication protocols to test the procedures and ensure staff understand the incident management processes.
- Develop a process to ensure that the records of CCP SCADA alarms (critical limit exceedances) are being documented.
- Develop formal processes for document control, including version control and ensure only current approved versions of documentation relating to the DWQMP is being used.

3.4 Relevance of the Plan

3.4.1 Compliance

The audit was required to assess the relevance of the DWQMP. The auditor assessed the following components for compliance.

- *Service description and details of infrastructure* – a **major non-compliance** was found with this audit requirement. The audit noted one (1) major non-compliance in relation the relevance of the plan. The Herbert River raw water source is an uncontrolled catchment and therefore has a risk of protozoa. Whilst there may be some filtration through the river bed, this is not a controlled process and there is no further treatment process to manage this risk. There are no defined monitoring protocols, critical limits or process controls to ensure that protozoa risk from this source is addressed. Additionally, it was noted during the site visit that though the schematics generally reflect the water supply system, fluoride dosing is not included in the process flow diagrams in Appendix B of the DWQMP and the detailed WTP schematics in Appendix C of the DWQMP do not show the chlorination and fluoridation dose points. Recommendations have been identified for this area.
- *Catchment characteristics and water quality information* – HSC was found to be **compliant** for this audit requirement. Catchment characteristics observed at audit were consistent with the catchment characteristics noted in the risk assessment and DWQMP.

3.4.2 Recommendations

The following recommendations have been made in relation to this audit area:

- Review flow diagrams to ensure that they accurately reflect the water supply system.
- Review raw water monitoring for the Herbert River supply and set targets and limits for process controls to ensure protozoa control and effectiveness of disinfection – US EPA Surface Water Treatment Rules: Unfiltered Systems.

3.4.3 Opportunity for Improvement

- Develop a drinking water policy and seek endorsement from Council to promote awareness and strengthen HSC's commitment to providing safe drinking water.

Glossary

Word	Description
ADWG	Australian Drinking Water Guidelines
DEWS	Department of Energy and Water Supply
DWQMP	Drinking Water Quality Management Plan
ECM	Enterprise Corporate Management
FNQROC	Far North Queensland Regional Organisation of Councils
HSC	Hinchinbrook Shire Council
OFI	Opportunity for Improvement
RMIP	Risk Management Improvement Plan
SCADA	Supervisory Control and Data Acquisition
WTP	Water Treatment Plant

Appendix A – Audit Checklist

Table 5 Detailed Audit Findings

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
Accuracy of Monitoring and Performance Data – Verify accuracy of monitoring and performance data supplied to the regulator				
<ul style="list-style-type: none"> Accurate Data 	<p>Current Reissued Amendment Approval Notice (4 November 2016)</p> <p>2014/2015 DWQMP Annual Report</p> <p>2015/2016 DWQMP Annual Report</p>	<p>Under the current reissued Approval Notice, HSC was required to submit a DWQMP Annual Report to DEWS by 19 December 2016.</p> <p>Water quality data is recorded on spreadsheets, for <i>Escherichia coli</i> and the standard water quality analysis. The spreadsheets were provided at audit and the data within the spreadsheets was compared with the data reported in the annual report for 2015/2016. The audit confirmed that for the data reviewed, the data in the annual report was accurate.</p> <p>As a cross check, the entire database is downloaded at the end of the financial year.</p> <p>Instances of non-compliance with the water quality criteria are reported in the annual reports however there were no non-compliance of a health parameter of the water quality criteria in the 2015/2016 financial year. This was consistent with the information available on water quality exceedances.</p> <p>Risk Management Improvement Plan (RMIP) items are included in the annual report. The RMIP is reviewed during the annual report development process, and the annual report includes columns to note the progress in implementing action items.</p> <p>Customer complaints are recorded in the Water and Sewerage Customer Request database. Within the database, there are options for dirty water and low pressure complaints. The database was demonstrated at audit. There is no option for recording taste and odour complaints, which may be a common complaint for drinking water. It was expected that these would most likely be captured as dirty water complaints, however this could not be confirmed. When a complaint is recorded within the database, an email is sent to the Water and Sewerage Team.</p> <p>HSC is transitioning to a whole of council system for recording complaints. The spreadsheet used to prepare the monthly report to council was shown and the number of dirty water complaints for the financial year was confirmed.</p>	<div style="background-color: green; color: white; padding: 5px; width: 30px; margin: 0 auto;">C</div>	<p><i>OFI</i></p> <p>Consider including an option within the complaints database for recording complaints about taste and odour.</p>

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
Compliance with the plan – Provisions and conditions in the Approval Notice				
<ul style="list-style-type: none"> DWQMP Report submission 	<p>Amendment Approval Notice (4 November 2016)</p> <p>Approval Notice 18 August 2015</p> <p>Approval Notice 25 March 2013</p> <p>2013/2014 DWQMP Annual Report</p> <p>2014/2015 DWQMP Annual Report</p> <p>2015/2016 DWQMP Annual Report</p> <p>DWQMP Report Submission Email 2015/2016</p> <p>DWQMP Report Email 2014/2015</p>	<p>The 2015/2016 DWQMP Annual Report submission email was provided as audit evidence, the email time stamp shows that it was submitted on 20 September 2016, before the required date of 19 December 2016.</p> <p>The 2014/2015 DWQMP Annual Report submission email was provided as audit evidence, included in the email is a preceding email from DEWS, asking for the report, which was overdue, on the 15 January 2016. The report was submitted on the 21 January 2016, after the due date (16 December 2015).</p> <p>The annual reports for 13/14, 14/15 and 15/16 financial years are available on the HSC website.</p>	C	<p><i>OFI</i></p> <p>Ensure that the DWQMP annual report is submitted within the required timeframe of 120 business days from the end of the financial year.</p>

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
Compliance with the plan – Implementation of preventive measures described in the plan				
<ul style="list-style-type: none"> Preventive measures clearly identified Preventive measures implemented 	<p>Current Approved Amended DWQMP (Rev D)</p> <p>Field verification visit</p>	<p>The DWQMP discusses existing preventative measures in section 4.3 and section 5.1.1., listing them in Table 4-6 of the plan. Table 5-1 of the plan provides additional information on each of the existing (and proposed) preventive measures, with focus on those managing high or extreme risks. Table 5-1 describes the hazardous event, the associated preventive measures, which risk/factor the preventive measure helps to mitigate, how effective the measure is, the residual risk, any proposed measures to reach an acceptable residual risk (if required) and the responsible work unit/organisation for the hazardous event. Preventive measures are given in some detail, however there are no documented procedures for the operation of preventive measures.</p> <p>During the field verification visits preventive measures were discussed and observed, such as treatment processes, operational monitoring with alarms and automatic shutdowns and corrective actions.</p> <p>The SCADA system is used to monitor critical limits and send alarms when the critical limit is exceeded. pH was noted in the DWQMP as an operational parameter with a critical limit. It was observed at audit that the alarm limit for pH had been changed in SCADA to a lower limit of 0.0 and an upper limit of 14.0. This indicates that critical limit alarms can be changed by an operator, and there is no process for approving or tracking changes to SCADA alarms.</p>	N	<p><i>Recommendation</i></p> <p>Develop a procedure for documenting changes to SCADA alarms, that includes approval and signoff of the changes by a person in a supervisory role. Include a process to regularly review SCADA alarms to ensure they are set at the correct value.</p>
Compliance with the plan – Implementation of operational and maintenance procedures				
<ul style="list-style-type: none"> Procedures implemented Currency Calibration Maintenance Reservoirs Training and Awareness Chemical procurement and deliveries 	<p>Current Approved Amended DWQMP (Rev D)</p> <p>Daily Log Sheet:</p> <ul style="list-style-type: none"> Ingham Depot and Ingham Pump Station January 2017 and March 2017 <p>Calibration records: 10/08/16 Fluoride meters 24/08/16 Halifax pH,</p>	<p>Operational and maintenance procedures are described in section 5.2 of the DWQMP. The DWQMP states that HSC is in the process of developing procedure and includes a list of draft procedures. This issue has been identified and is an item in the Risk Management Improvement Plan (RMIP). Section 5.2 (page 70) also includes a preliminary list of operation and maintenance procedures that will be developed. The target date for developing the procedures formally is set to 30 June 2016 in the plan. Draft versions of some of the procedures (Responding to an <i>E coli</i> detection and Water Quality Sampling) were viewed at audit. Both procedures are still in the process of being written and have not been reviewed or finalised. At audit it was discussed that it is challenging to allocate time to these procedures. Operational procedures have been developed for fluoride dosing management, as shown at audit.</p> <p>It is noted that the water team are experienced operators, with extensive knowledge about operating the system, and that the activities that would be contained within the procedures are being undertaken, albeit informally.</p>	C	<p><i>OFI</i></p> <p>Document the chemical procurement, delivery and receipt process to ensure relevant risks are managed (e.g. incorrect chemical, incorrect chemical strength, sufficient chemical quantity at hand, stock rotation).</p> <p>Review the procedures for calibrating monitoring equipment to ensure that results are reliable. The process should include identification of acceptable variation between hand held and online equipment, to note where full calibration is required, rather than adjustment.</p> <p>Ensure the contractor puts calibration stickers on instruments to indicate the date of calibration and</p>

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
	<p>chlorine depolox 25/08/16 Forest Beach pH, chlorine depolox Site Visit to Ingham Pump Station Site Visit to Depot Treatment Plant</p>	<p>Additionally, there are no Operation and Maintenance (O&M) Manual for the treatment plants.</p> <p>Chemical procurement and management</p> <p>The procurement of Sodium hypochlorite is undertaken under the FNQROC procurement procedure. Deliveries are noted on the daily log sheet at each treatment plant by noting a “Y” or ‘N” in the appropriate column. The Forest Beach log sheet for January 2017 was viewed at audit, it showed that there had not been any deliveries in January.</p> <p>Fluoride is ordered when the operator fills out a form (a spreadsheet) and sends it to water team. The form was shown at audit WF27 Water Fluoridation – 25 kg NAF Stocktake and Delivery form. The completed form from 17/04/2013 - 15/9/15 was shown at audit. Certificate of analysis all certificates are emailed to the stores manager and recorded in the ECM record keeping database. The fluoride delivery docket from 27/02/2017 and the fluoride certificate of analysis signed 27/2/2017 were shown at audit.</p> <p>There is no formal process for ordering other water treatment chemicals, with the operators arranging for a local supplier to order lime, which is collected by operators. There is no process for evaluating chemicals for suitability for water treatment, certificates of analysis are not collected.</p> <p>Calibration</p> <p>Calibration is undertaken using a combination of internal and external calibrations. Operators undertake a check of the online analysers daily and compare the results against the handheld chlorine analyser that is externally calibrated on a 3 monthly basis.</p> <p>The daily log sheet is used to record in-house calibration. It was noted that at times, there was a large variation between the chlorine reading on the online analyser and the handheld device, in this case it is assumed that the online analyser is adjusted. There was no consideration of when a variation is recorded, if it is suitable to adjust rather than undertake full calibration. Calibration was noted as a “y” where adjustment was made. The daily log sheet reviewed at audit noted that the variation can be over 0.5 mg/L at times, often several times in one week, with the online analyser being adjusted rather than recalibrated.</p> <p>Maintenance</p> <p>The progress for implementing maintenance processes was discussed at audit. Whilst there is no formal process for undertaking maintenance, HSC has made significant progress by refurbishing reservoirs, water towers and other infrastructure over the last 10 years. This is noted on the RMIP.</p> <p>Additionally, operators undertake daily checks around the plant, and where</p>		<p>next due.</p> <p>Document the reservoir inspection and cleaning program, including frequency and records, and ensure that it is implemented.</p> <p>Formalise the performance review process to ensure training needs are identified and progressed.</p>

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
		<p>possible undertake repairs. Every two or three months the fitters do a check of equipment.</p> <p>Requests can be made through the maintenance database. Water requests are approved by the water team, and actions are allocated to a person to complete. A form is generated, which is filled in once the maintenance is complete and returned to the water team for input into the database.</p> <p>Reservoirs</p> <p>The DWQMP states that reservoir visual inspections are undertaken daily. At audit is was discussed that the records of the daily checks are recorded on the daily log sheet, however the log sheet for the Forest Beach High Lift Station did not note any inspections. Also, it was discussed that issues are reported verbally and addressed as needed, either by operators or through the maintenance database request process.</p> <p>Training and awareness</p> <p>Competency is evaluated during the recruitment process. There is an informal process for undertaken training or attending conferences. Performance reviews will be rolled out in July 2017, with templates being distributed at present. It is expected that the performance reviews will identify training needs and provide a mechanism for progressing training and awareness.</p>		

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
Compliance with the plan – Implementation of process for managing incidents and emergencies				
<ul style="list-style-type: none"> • Process documented • Incident management • Staff training 	Current Approved Amended DWQMP (Rev D)	<p>Section 5.3 of the plan describes the management of incidents and emergencies. Table 5-2 details the incident and emergency levels, how each level is managed and who is responsible. Table 5-3 describes management of incident and emergencies in detail, as well as corresponding emergency contact details and protocols. The table is organized in levels (corresponding to those described in Table 5-2), with summaries of actions to be taken for each type of incident/emergency listed. Trigger values for <i>E. coli</i> detections in the reticulation are also provided.</p> <p>A Local Disaster Management Plan is provided in Appendix G of the plan, and an Evacuation Sub Plan is in Appendix F of the plan, which are both referred to in the incident and emergency table (5-3).</p> <p>The communication protocol for notifying the consumer in case of an incident or emergency is included in section 5.3.1 of the plan. Local radio, newspaper and television station are generally used to communicate with the public. Council is also able to leave SMS messages and recorded phone messages (for landlines) via a Telstra service, in the case of a cyclone. The area of communication is transferred to Telstra using a KML file, produced by HSC's GIS system. In the case of major <i>E.coli</i> detection in the reticulation network, it is the intention of HSC to use the same Telstra system to broadcast the required actions.</p> <p>Water quality exceedance records are kept through the records management system – Enterprise Corporate Management (ECM) record keeping system. The non-compliance folder was shown at audit which included Part A – dated 29/7/14 and Part B.</p> <p>Whilst there is no formal record keeping for incidents and emergencies, water quality results are recorded on the spreadsheet.</p> <p>Operators have Cert III and Cert IV training which includes some incident management. There is no formal process for training on water incidents and no drills or testing of emergency scenarios are undertaken.</p>	C	<p><i>OFI</i></p> <p>Consider establishing an incident and emergency response plan, that captures the detail in the DWQMP in a standalone document.</p> <p>Formalise record keeping processes for water quality incidents</p> <p>Develop a training module for managing water quality incidents</p> <p>Undertake scenario testing of incident and emergency response and communication protocols to test the procedures and ensure staff understand the incident management processes.</p>
Compliance with the plan – Implementation of operational and verification monitoring plan				
<ul style="list-style-type: none"> • Operational monitoring plan implementation • Verification monitoring plan implementation 	Current Approved Amended DWQMP (Rev D)	<p>The operational and verification monitoring programs undertaken at HSC are described in Section 6 of the DWQMP.</p> <p>Operational Monitoring</p> <p>Section 6.1 describes operational monitoring undertaken by HSC. Operational monitoring includes water quality monitoring to assess and confirm the performance of preventative measures. Water quality is monitored online, and data collected is used as a trigger for corrective</p>	C	<p><i>OFI</i></p> <p>Develop a process to ensure that the records of CCP SCADA alarms (critical limit exceedances) are being documented.</p>

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
<ul style="list-style-type: none"> Targets and limits 		<p>actions to improve drinking water quality. Where possible, operational parameters are monitored online and continuously to detect failures in a timely manner (particularly for critical control points). HSC use SCADA for monitoring specific section of the water supply, chlorine residual, reservoir levels and pump hours and flow rates and daily grab sampling. Table 6-1 describes the operational monitoring for all three HSC schemes, and identifies monitoring location and critical limits. It identifies the parameter monitored, the associated hazard, the sampling frequency, method and analysis, target limits, action if target is exceeded, the critical limit and action if the critical limit is exceeded.</p> <p>Any critical limit exceedances are recorded on the daily log sheet in the comments column, however there were no exceedances to observe during the audit.</p> <p>The SCADA monitoring described in the DWQMP was confirmed at audit, and the critical limits were reviewed. It was noted that mostly, SCADA alarm limits are set to be more conservative than the critical limits in the DWQMP. When reviewing the critical limits for pH, it was noted that the alarm limit for low had been changed to 0.0 and the high was 14.0. It was discussed that all operators can change alarm limits and there was not approval process to evaluate and record changed to SCADA alarms.</p> <p>Verification</p> <p>Section 6.2 describes the verification monitoring carried out by HSC. HSC's verification monitoring plan includes monitoring at representative points throughout the supply system. All source waters, treatment processes and distribution system are routinely monitored for a range of parameters, as recommended in the ADWG.</p> <p>Table 6-2 describes the verification monitoring for all schemes. The parameter monitored, the location, the ADWG/regulation value for the parameter, associated hazard, frequency, analysing authority and response to exceedances are described in this table. Table 6-3 describes the verification monitoring locations and associated sample point numbers. The verification sample points have been chosen per areas likely to represent worst case (e.g. low pressure areas, end of reticulation mains). Samples are taken on a rotational basis between these sample locations.</p> <p>All water samples taken by HSC are processed at the Queensland Health laboratory in Brisbane. When immediate results are required (e.g. during flooding), samples processed at the Townsville City Council laboratory. HSC has a draft operating procedure for collecting water samples. This procedure addresses data handling, the monitoring program, communication procedures and transportation of samples.</p>		

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
		<p>Raw water samples are collected from the bore and at the aerator. At the Ingham Pump Station a raw water sample is taken from the river intake. Samples for treated water are taken from reservoirs associated with each treatment plant. Critical points in the reticulation have also been identified as sample locations. Samples are collected by the WTP operator, packed into eskies and sent to Townsville via road freight and then flown to Brisbane overnight to the Queensland Health Laboratory.</p> <p>The verification monitoring program is captured on a spreadsheet, showing where and when samples are to be taken. Operator Cert II and Cert III training includes taking water quality samples.</p> <p>Water quality data is captured in spreadsheets for the three schemes, once the lab reports are received.</p>		
Compliance with the plan – Implementation of risk management improvement program				
<ul style="list-style-type: none"> • Improvement program implementation • Monitoring progress • Continual improvement 	<p>Current Approved Amended DWQMP (Rev D)</p>	<p>The Risk Management Improvement Program (RMIP) is discussed in section 5.4 of the DWQMP. It is included as Table 5-4 of the plan. It aims to manage any unacceptable residual risks identified by the hazard/risk assessment, manage any gaps in the plan, improve part of the plan where deficiencies in information did not allow the criteria to be completely and accurately addressed. Items in the RMIP are prioritised based on the level of risk that is addressed by the item, and the historical performance of the scheme. Priorities are rated from Low, Medium, High and Very High. The RMIP describes the scheme, the hazard/hazardous event the item addressed, priority rating, actions (interim, short-term and long-term), target dates, estimated cost, responsibility and whether its completed.</p> <p>RMIP items were discussed at audit, and it was found that the RMIP is being progressed and actions are being completed, for example, replacement of bore heads is largely completed. The Forest Beach pipeline is also completed.</p> <p>As discussed previously, completion and establishment of operational procedures has not been completed.</p>	<p>N</p>	<p><i>Recommendation</i></p> <p>Progress the establishment of operational procedures, prioritise those procedures noted in the risk assessment that manage significant risks.</p>

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
Compliance with the plan – Maintaining records as described in the plan				
<ul style="list-style-type: none"> Records management 	Current Approved Amended DWQMP (Rev D)	<p>Section 5.5 details information management at HSC. Table 5-5 summarises the water quality management information management. The table includes the information/document title/description, the format, where it is stored, position responsible for the document and any comments.</p> <p>Section 5.5.1 describes the record retention requirements, where all documents related to the operation of the water supply are retained either as hard copy or electronically for as long as possible. Technology One ECM system is the records keeping system, which was demonstrated at audit.</p> <p>The record keeping requirements detailed in Table 5-5 were reviewed and confirmed at audit. It was noted that there is no formal process for document management, including identifying current and controlled versions, version control in general or superseding old versions. It was discussed that staff use different and old version of procedures, forms and templates.</p>	C	<p><i>OFI</i></p> <p>Develop formal processes for document control, including version control and ensure only current approved versions of documentation relating to the DWQMP is being used.</p>
Compliance with the plan – Undertaking reviews at the frequency specified in the Approval Notice				
<ul style="list-style-type: none"> Review undertaken Review process 	<p>Current Approved Amended DWQMP (Rev D)</p> <p>Current Reissued Amendment Approval Notice (4 November 2016)</p> <p>Email to DEWS submitting a Review Document</p> <p>DWQMP Review Report (2015)</p>	<p>According the DWQMP, a review of the was conducted on the 25 March 2015.</p> <p>A report detailing the amendments to the then DWQMP was also submitted as audit evidence.</p> <p>The review was carried out using question based on prompts from the <i>DWQMP Review and Audit Guidelines</i> developed by DEWS. The review questions were divided into sections per the <i>Review and Audit Guidelines</i>, then each review question was answered with comments, and whether the DWQMP required amendments.</p> <p>All sections which required amendments were recorded and Section 3 of the Review report details the amendment descriptions and noted the relevant sections of the DWQMP to be amended.</p> <p>Advice was sought from the Regulator regarding the requirements to amend the DWQMP. The decision was made to submit an amendment which was approved on 18 August 2015.</p>	C	NA

Checklist	Evidence	Findings and Discussions	Compliance Grade	Recommendation / OFI
Relevance of the plan – Service description and details of infrastructure reflect current circumstances				
<ul style="list-style-type: none"> • Infrastructure • Risk management • Monitoring 	Site Visit to Ingham Pump Station Site Visit to Depot Treatment Plant	<p>The schematics generally reflect the water supply system; however, it was noted that the fluoride dosing is not noted on the process flow diagrams in Appendix B of the DWQMP. The detailed water treatment plant schematics in Appendix C do not show the chlorination and fluoridation dose points, but do show the analysers.</p> <p>The DWQMP has identified operational monitoring and critical limits, but does not include assessment of critical control points, therefore, it is not clear which operational monitoring is critical to producing safe drinking water.</p> <p>In addition, there are preventive measures that are not clearly documented, for example, the Herbert River supply at the Ingham Pump Station is only used when the raw water turbidity is considered acceptable. The acceptable level is not documented, and the raw water turbidity can vary when pumping. As this treatment system does not include a filtration step, the selective extraction of raw water relies on the turbidity to be of level that can ensure effective disinfection. In addition, the Herbert River raw water source is an uncontrolled catchment and therefore has a risk of <i>cryptosporidium</i>. Whilst there may be some filtration through the river bed, this is not a controlled process and there is no treatment process to manage this risk. The acceptable turbidity level should be determined, and the chlorine dose should be set to achieve adequate <i>C.t.</i> to ensure adequate disinfection and address <i>cryptosporidium</i> risk.</p> <p>It was noted that whilst the DWQMP has been adopted by council, a drinking water quality policy has not been developed or endorsed by HSC.</p>	M	<p><i>Recommendation</i></p> <p>Review flow diagrams to ensure that they accurately reflect the water supply system.</p> <p>Review raw water monitoring for the Herbert River supply and set targets and limits for process controls to ensure protozoa control and effectiveness of disinfection – US EPA Surface Water Treatment Rules: Unfiltered Systems.</p> <p><i>OFI</i></p> <p>Develop a drinking water policy and seek endorsement from Council to promote awareness and strengthen HSC’s commitment to providing safe drinking water.</p>
Relevance of the plan – Confirm catchment characteristics and water quality information reflect current circumstances				
<ul style="list-style-type: none"> • Catchment • Water quality information 	Field verification visit to Herbert River intake and Como Road Bore field Microbiology spreadsheet 15/16	<p>Catchment characteristics observed at audit were consistent with the catchment characteristics noted in the risk assessment and DWQMP.</p> <p>The Herbert River supply is highly variable and is only used when water quality is good. This is documented in the DWQMP and was observed at audit, as the water quality in the Herbert was turbid, therefore the river source was not being utilised.</p> <p><i>E. coli</i> is sampled in the raw water sources. The results show instances of <i>E. coli</i> in the raw water bore sources. This is captured in the risk assessment. HSC rely on compliance with the plumbing code to protect groundwater sources.</p>	C	NA



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