IPART Independent Pricing and Regulatory Tribunal | NSW

Sydney Water 2021 operational audit

Report to the Minister

February 2022

Water

Tribunal Members

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The Independent Pricing and Regulatory Tribunal (IPART)

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Acknowledgment of Country

IPART acknowledges the Traditional Custodians of the lands where we work and live. We pay respect to Elders, past, present and emerging.

We recognise the unique cultural and spiritual relationship and celebrate the contributions of First Nations peoples.

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Summary

Customers in NSW rely on safe and reliable water and wastewater services. Operating licences outline obligations imposed by the NSW Government on publicly owned monopoly suppliers of essential services such as Sydney Water Corporation (Sydney Water). We undertake annual operational audits to ensure Sydney Water meets the requirements under its licence.

This is our report to the Minister for Lands and Water on the 2021 operational audit as required under the *Sydney Water Act 1994* (Act). In 2021, we audited Sydney Water's compliance with 37 clauses of the Sydney Water 2019-2023 Operating Licence (Licence).[1] Sydney Water has also provided a report, by an approved auditor, assessing Sydney Water's compliance with clauses 9.1.1 and 9.1.2 of the Licence.[2]

Key findings in 2021

- Sydney Water has demonstrated a high level of compliance with the licence clauses tested during the 2020-21 audit. Sydney Water did not fully comply with, or had minor shortcomings relating to 8 licence clauses. This is a significant improvement on the results of the 2019-20 audit which found that Sydney Water did not fully comply with, or had minor shortcomings relating to 13 licence clauses
- During 2020-21, Sydney Water was non-compliant (non-material) with 4 clauses because it:
  - did not fully implement its Asset Management System in relation to managing risks arising from Potts Hill reservoir roof degradation
  - failed to identify and assess the risk to water quality from the Potts Hill reservoir roof degradation
  - did not fully meet its reporting obligations in relation to 2 clauses. This included gaps and errors in reported data and failing to provide information as per the Reporting Manual.

  Although the auditor found the non-compliance relating to implementation of Sydney Water's Asset Management System at Potts Hill reservoir to be material, we have decided that it does not meet the threshold for materiality and report the non-compliance in this report as non-material. We explain our reasoning in Chapter 2.
- During 2020-21, Sydney Water was compliant (minor shortcomings) with 3 clauses relating to its drinking water and recycled water obligations because it had gaps and inconsistencies in documentation, some documents were not current and there were incorrect references in the document repository.

[1] Our report presents an exception-based summary of the audit. We discuss any audited clause which did not receive a "Compliant" grading in Chapter 2. For the full findings of the audit refer to the auditor's report in Appendix D.

[2] In particular, the report assesses the adequacy of Sydney Water's Cyber Security Management System (CSMS) as required by clause 7.1 of the Reporting Manual.

- Sydney Water was compliant (minor shortcomings) with one critical infrastructure clause because it has not fully implemented some of the controls required to implement its Cyber Security Management System.

The auditors have made 16 recommendations to Sydney Water relating to the operational audit, and 4 recommendations relating to cyber security, to rectify the issues that resulted in the findings of non-compliant (non-material) or compliant (minor shortcomings).[3]

Audit findings and recommendations are further discussed in Chapter 2.

Previous audit findings

This audit also followed up on Sydney Water's progress in addressing non-compliances or shortcomings identified in previous audits. Sydney Water has:

- closed out 4 previous non-compliances (2 material and 2 non-material) by completing the 4 related recommendations
- completed 3 out of the 7 recommendations relating to 4 non-material non-compliances
- completed 5 out of 13 recommendations relating to 5 compliant (minor shortcomings) grades.

Our discussion of Sydney Water's progress with previous recommendations is presented in Chapter 3.

[3] Auditors are only required to make recommendations for grades other than Compliant grades – i.e. for Compliant (minor shortcomings), Non-compliant (non-material) and Non-compliant (material) grades. This is consistent with our audit guideline for public water utilities (IPART, *Audit Guideline – Public Water Utilities*, July 2019).

1 Introduction

We engaged specialist auditing firm, Atom Consulting (Atom) in partnership, to undertake the audit on our behalf. This report summarises the audit findings for the Minister for Lands and Water.[i]

Sydney Water also engaged Certitude Technology Risk Services, an IPART approved auditing firm, to assess the adequacy of its Cyber Security Management System (CSMS).[4]

1.1 Sydney Water's operational performance in 2021

The 2021 audit results raise some concerns with Sydney Water's performance, most notably on asset management. The Tribunal has decided not to take enforcement action on these non-compliances but will engage with Sydney Water to improve compliance. The quality of water produced by Sydney Water continues to be of a high standard that meets public health requirements.

1.2 Annual statement of compliance

In preparing this report we have also considered Sydney Water's annual Statement of Compliance (Appendix F). The Statement of Compliance is an exception-based report[5] certified by Sydney Water's Managing Director and the Chair of the Board of Directors. It explains what remedial action Sydney Water has taken, or is taking, to resolve outstanding non-compliances.

This year Sydney Water reported that it had no non-compliances with the Licence.

1.3 Audit scope

The 2021 audit covered the period from 1 July 2020 to 30 June 2021. Appendix B describes the audit process and Appendix C includes the detailed audit scope.

[4] Section 7 of the Reporting Manual contains auditing and reporting obligations for Sydney Water – to provide an audit report from an independent auditor that assesses the adequacy of its Cyber Security Management System (CSMS).

[5] That is, Sydney Water is only required to report on clauses where it considers it is non-compliant.

2 Audit findings and recommendations

This chapter sets out the auditor's findings relating to non-compliance and minor shortcomings. The auditor also identified some opportunities for improvement in Sydney Water's operational audit report, provided in Appendix D.

The compliance grades used in this report are explained in Appendix A. Our Reporting Manual[ii] requires Sydney Water to report on its progress in implementing these recommendations by 31 March 2022.[6]

The 2021 audit is the second operational audit of Sydney Water's compliance with the requirements of the current Licence. Comparison of non-compliant and minor shortcomings audit findings across both audit years are presented in Table 1 below.

Table 1: Comparative record of non-compliant findings and identified shortcomings for the 2019-2023 Operating Licence

Licence clause	Requirement	Compliance grade			
		2019-20[a]	2020-21[b]	2021-22	2022-23
1.7.1	Licence context - pricing	✗	✓	-	-
3.1.1	Sydney Water must maintain a water conservation program consistent with the Current Economic Method.	✗	✓	-	-
3.1.2	Water Conservation and Planning – economic approach for water conservation	✗	✓	-	-
3.2.4	Water Conservation and Planning – water planning	✗	✓	-	-
4.1.1	Performance Standards for Water Quality – drinking water – consistent with ADWG	✓	✓	-	-
4.1.3	Performance Standards for Water Quality – drinking water – implementation	✓	✗	-	-
4.2.1	Performance Standards for Water Quality – recycled water – consistent with AGWR	✓	✓	-	-
4.2.3	Performance Standards for Water Quality – recycled water – implementation	✓	✓	-	-
5.1.1	Performance Standards for Service Interruptions – water continuity standard	✗	✓	-	-
5.2.5	Performance Standards for Service Interruptions – water pressure standard	✗	-	-	-
5.5.2	Performance Standards for Service Interruptions – asset management	✗	✗	-	-
9.1.1[c]	Cyber Security Management System - maintain	✗	✓		

[6] We may agree to receiving the progress report later than the date in the reporting manual.

Licence clause	Requirement	Compliance grade			
		2019-20[a]	2020-21[b]	2021-22	2022-23
9.1.2[c]	Cyber Security Management System - implement	✗	✓		
9.2.1[c]	Critical infrastructure compliance manager	-	✓		
9.3.1[c]	National security clearances	-	✓		
10.2.2	Performance Monitoring and Reporting - reporting	✗	✗	-	-
10.2.4	Performance Monitoring and Reporting – record systems	✓	✗	-	-

Source:

a) Sydney Water Corporation *Operational Audit 2020 – Report to the Minister – Compliance Report*, March 2021.

b) Atom Consulting, *Sydney Water 2021 Operational Audit Report*, February 2022 (Appendix D); Report on clauses audited by IPART (Appendix E);

c) Certitude Technology Risk Services, *Licence Conditions Audit – Cyber Security Management System for Sydney Water,* August 2021.

Note: ✓ = Compliant; ✓ = Compliant (minor shortcomings); ✗ = Non-Compliant (non-material); ✗ = Non-Compliant (material)

2.1 Asset Management System non-compliance

The auditor assigned one non-compliant (material) grade, to clause 5.5.2 of the Licence which requires Sydney Water to 'ensure that the Asset Management System (AMS) is fully implemented and that all relevant activities are carried out in accordance with the AMS'.

The auditor found that Sydney Water did not implement its AMS in full due to its management of risk at Potts Hill reservoir. The audit identified that Sydney Water did not address the change in risk arising from the failing roof liner over the reservoir. The failing roof liner increased the risk of ingress of contaminants into the reservoir. This failure to reassess risk was not consistent with the requirements of the Asset Management Policy and the AMS. In the auditor's opinion, Sydney Water thereby compromised its ability to achieve its defined Asset Management Objective – *'to ensure key risks are understood and the appropriate controls to mitigate and adopt risks are in place*'.

However, while we agree with the auditor's finding of non-compliant, we consider that the threshold for a material non-compliance as defined by our audit guidelines[7] was not reached.[8]

7 IPART, *Audit Guideline – Public Water Utilities*, July 2019.

8 A Material non-compliance is defined as *"Sufficient evidence is not available to confirm the requirements have been met and the deficiency does adversely impact the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes."*

We considered the auditor's findings and additional information provided by Sydney Water in post-audit meetings with the auditor and IPART. We believe Sydney Water met the overarching objective of its AMS – to maintain water supply to all its customers. Sydney Water's decisions were taken in a system-wide context, and it decided to prioritise water supply across the entire network over the repairs to the liner, during and following a period of drought and bushfire impacts on its main water supply reservoir at Warragamba Dam. One of the impacts of this decision was that it could not take Potts Hill offline during this period.

Full compliance with Sydney water's asset management system, and best practice risk management would mean that Sydney Water would have undertaken and documented a review of the increasing risk to water quality presented by the deterioration of the roof liner. The auditor was unable to ascertain that such a risk review was undertaken. Sydney Water accepts there were shortcomings with properly documenting the governance and decision-making steps that supported its management of the Potts Hill reservoir risk.

We agree with the auditor that Sydney Water's main area of non-compliance was failing to document when and how it evaluated the operational risk presented by the deterioration of the reservoir liner. However, although Sydney Water was non-compliant with clause 5.5.2, we do not consider that the compliance was material. This is because we consider that the 'adverse impact' requirement for a material non-compliance under the Audit Guideline was not met.

While Sydney Water did not document its re-assessment of water quality risks due to the worsening of its liner, Sydney Water has significant controls in place to monitor and assess water quality and has continued to manage risk to public health from water contamination. These include:

- significant dilution of any potential contaminants due to the size of the reservoir
- maintaining a high chlorine residual in the treated water
- monitoring at reservoir
- additional downstream monitoring and chlorine dosing capability
- repairs to tears in the liner.

Further discussion of this issue with Sydney Water operations staff indicated that there is sufficient day-to-day monitoring and review of operational issues that may affect water quality to provide confidence that the non-compliance would not adversely impact Sydney Water's ability to provide high quality water.

2.2 Audit findings and recommendations summary

Table 2 provides details of non-compliances and minor shortcomings identified in the audit. Recommendations to address the inadequacies are also detailed.

Table 2: Non-compliances and minor shortcomings identified in Sydney Water's 2021 Operating Licence audit

Licence clause	Requirement	Compliance grade	Audit finding	Recommendations
4.1.1	Sydney Water must maintain a Management System that is consistent with the Australian Drinking Water Guidelines (ADWG) and any requirements relating to Drinking Water specified by NSW Health (the Drinking Water Quality Management System)	Compliant (minor shortcomings)	We have assigned Sydney Water a Compliant (minor shortcomings) for clause 4.1.1. This agrees with the auditor's findings. Sydney Water demonstrated that it maintained a management system consistent with the ADWG with minor shortcomings in the following areas: • The Drinking Water Management Manual had sections that were out of date (particularly element 8). • Gaps in the Macarthur Water Filtration Plant (WFP) Drinking Water Quality Management Plan. • Incorrect document links in Helix. • Currency of Helix (including text containing out of date references, incorrect document links and inconsistency in operational documentation recorded in Helix). • Processes to manage site specific stakeholders to ensure adequate risk communication and avoidance of control degradation.	**2021-1:** By 30 June 2022, Sydney Water establish processes, accountabilities and schedules for the review of the DWQMP including descriptive text in Helix, accurate links within Helix, updating of the Drinking Water Management Manual. The review frequency of review should reflect the frequency with which each aspect changes. Processes to ensure the reviews are conducted must be established. Sydney Water must prioritise the review aspects noted in this audit report including Element 8 and the documentation of how Sydney Water meets its obligations to prepare an annual report to customers and stakeholders (element 10) so the DWQMP accurately reflects Sydney Water's practices. By 30 June 2023, Sydney Water ensures that the water quality management system and supporting procedures are current and do not rely solely on the specified review period but also consider non time-based triggers. **2021-2:** By 30 June 2022, the Macarthur Drinking Water Quality Management Plan be updated to address all the relevant actions in the Framework for drinking water quality management. There is also further opportunity for improvement to document the ADWG actions that are only addressed by Sydney Water's DWQMS.
4.1.3	Sydney Water must ensure that the Drinking Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Drinking Water Quality Management System and to the satisfaction of NSW Health.	Non-Compliant (Non-Material)	We have assigned Sydney Water a Non-compliant (non-material) grade for clause 4.1.3. This agrees with the auditor's finding. Shortcomings were identified for this clause include: • Lack of evidence to support that the dynamic nature of risk to water quality due to end of life deterioration of the Potts Hill reservoir roof liner had been identified and assessed, and mitigative actions implemented. • Failure to consistently implement the requirements of the Operational Risk Assessment Workshop procedure • The flow diagram prepared for the Macarthur risk assessment did not include a recycle stream. The water quality risks from this stream were not identified in the risk assessment. • Mistakes in chemical testing records.	**2021-3:** By 30 June 2022, Sydney Water reviews its process to ensure NSW Health is invited to all risk assessments which consider public health risks (across all relevant risk assessments, including. operational, incident management, projects). **2021-4:** By 30th June 2022, Sydney Water completes its current improvement project on incident investigations and its current review cycle of preventative aspects of the Incident Management and Emergency Management Procedures, such as business impact assessments and continuity plans and have evidence of implementation of the project outcomes. **2021-5:** By 30 June 2022, Sydney Water has evidence to demonstrate that the operational risk assessment workshop procedure (D0000799) has been fully implemented for both the WFP and networks. This includes the identification of all recycle streams in the PFD as per D0000685.

Licence clause	Requirement	Compliance grade	Audit finding	Recommendations
			• The investigation into the Macarthur WFP extreme wet weather event was not completed in the timeframe required by the work instruction. • An incident investigation has not been conducted for the Potts Hill roof liner failure.	**2021-6:** By 30th June 2022, Sydney Water undertake a formal risk assessment on the residual lagoon at Macarthur WFP to identify circumstances where chemical spills and other contaminants may enter the lagoon and be returned to the head of the works and ensure processes and procedures for monitoring and managing these risks are adequate and implemented. This risk assessment may be undertaken as part of the annual risk review. **2021-7:** By 30th June 2022, Sydney Water review the instrument calibration and checks for the Hach Pocket Colorimeter to ensure the requirements are clarified, documented and implemented.
4.2.1	Sydney Water must maintain a Management System that is consistent with the Australian Guidelines for Water Recycling (AGWR) and any requirements relating to water recycling specified by NSW Health (the Recycled Water Quality Management System).	Compliant (minor shortcomings)	We have assigned Sydney Water a Compliant (minor shortcomings) grade for clause 4.2.1. This agrees with the auditor's finding. Sydney Water has demonstrated that it is has a fully implemented Recycled Water Quality Management System, apart from shortcomings in the following areas: • Discrepancies between the monitoring plan in the Liverpool Recycled Water Quality Management Plan (RWQMP) and the annual Recycled Water Monitoring Plan. • Minor discrepancies between documentation version in change summary table and footers. • Work Instruction for Creation of Process Flow Diagrams (D0000685) has no specific instructions or examples for recycled water, particularly around the display of multiple CCP trains. • The Liverpool RWQMP contained two different flow diagrams and only one was consistent with the Work Instruction for Creation of Process Flow Diagrams.	**2021-8:** By 30 June 2022, Sydney Water resolve or remove the discrepancies between the monitoring plans in the Liverpool RWQMP and the annual Recycled Water Monitoring Plan. **2021-9:** By 31 December 2022, Sydney Water must update Work Instruction for Creation of Process Flow Diagrams (D0000685) to include specific instructions and examples for recycled water. Update all recycled water flow diagrams to be consistent with the updated work instruction. Update the Liverpool RWQMP to only include one flow diagram. **2021-10:** By 30 June 2022, Sydney Water must incorporate management review requirements for recycled water and drinking water management systems into the Management Review Procedure. **2021-11:** By 30 June 2022, Sydney Water must incorporate audit requirements for recycled water and drinking water management systems into the 2LOA Audit Procedure.
4.2.3	Sydney Water must ensure that the Recycled Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Recycled Water Quality Management System and to the satisfaction of NSW Health.	Compliant (minor shortcomings)	We have assigned Sydney Water a Compliant (minor shortcomings) grade for clause 4.2.3. This agrees with the auditor's finding. Sydney Water has demonstrated that it has a fully implemented Recycled Water Quality Management System, apart from shortcomings in the following areas: • No procedure describing appropriate disposal times for used pH calibration reagents.	**2021-12:** By 31 March 2022, Sydney Water update Irrigation Scheme Monthly Reports to include explanations when fewer samples are required in the period than the frequency in the monitoring plan (e.g. if there are four weeks in the month why are less than four weekly samples required).

Licence clause	Requirement	Compliance grade	Audit finding	Recommendations
			• Irrigation Scheme Monthly Reports showed number of required samples collected was less than required in the monitoring plan.	
5.5.2	Sydney Water must ensure that the Asset Management System is fully implemented and that all relevant activities are carried out in accordance with the Asset Management System.	 Non-Compliant (Non-Material)	We have assigned Sydney Water a Non-compliant (non-material) grade for clause 5.5.2. The auditor's assigned this clause a grade of Non-compliant (material). We consider that the threshold for materiality was not met and the deficiency did not adversely impact Sydney Water's ability to assure controlled processes or products. The deficiencies identified by the auditor were: • Lack of evidence to support that Sydney Water understood, assessed and managed the changing risk to water quality due to end of life deterioration of the Potts Hill reservoir roof liner during the audit period. • Sydney Water did not manage its assets in accordance with its Asset Management Policy, and Asset Management Objectives, namely to "to ensure key risks are understood and the appropriate controls to mitigate and adopt risks are in place". • Sydney Water has not engaged with NSW Health as an important stakeholder relating to public health in accordance with its stated stakeholder engagement processes	**2021-13:** By 30 June 2022, Sydney Water reviews its project development and assurance approach (i.e. business case and gateway process and documents) to determine whether the mitigation measures identified in project risks assessments are recorded and their implementation tracked. **2021-14:** By 30 June 2022, Sydney Water reviews any public health related project risks to determine whether the management of these risks is in accordance with its risk management framework.
9.1.2	From the Commencement Date (or another date approved by IPART in writing), Sydney Water must ensure that the Cyber Security Management System is fully implemented and that all relevant activities are carried out in accordance with the Cyber Security Management System.	 Compliant (minor shortcomings)	There are 14 Controls within Licence condition 9.1.2, 7 were compliant and 7 were compliant with (minor shortcomings). The Auditor did not raise any new recommendations for Sydney Water. The auditor noted that the ongoing actions in progress from the previous Cyber Security Audit in 2020 are expected to address the minor shortcomings identified in the Cyber Security Management System: Note: these recommendation numbers differ from the operational audit numbering system.	**REC 1 (FY2021)**: Develop a comprehensive Asset Management process and support procedures for the IT environment and the adoption of a comprehensive asset registration system covering both OT and IT environments. **REC 2 (FY2021):** Develop and implement a Data Loss Prevention (DLP) framework and rules to ensure data cannot be exfiltrated outside of the OT or IT network to internal or external sources. Consider enabling DLP within the Office365 implementation as part of that framework. **REC 3(FY2020)**: Develop and implement secure Software / System Development procedures supported by appropriate policy and procedural documentation. **REC 4 (FY2020)**: Ensure that scheduled and regular comprehensive Incident Response exercises are conducted including table-top, walkthrough reviews, and full scale.

Licence clause	Requirement	Compliance grade	Audit finding	Recommendations
10.2.2	Sydney Water must comply with all of its reporting and auditing obligations set out in the Reporting Manual, including in relation to: a) water conservation and planning; b) performance standards for water quality c) performance standards for service interruptions; d) customers and consumers; e) information and services for competitors; f) critical infrastructure security; and g) performance monitoring and reporting.	Non-Compliant (Non-Material)	We have assigned Sydney Water a Non-compliant (non-material) grade for clause 10.2.2. This agrees with the auditor's findings. Two non-compliances were found: • When reporting performance standards for service interruptions, Sydney Water did not provide information relating to major drivers for observed performance and variances to historical performance for all three indicators as required under the Reporting Manual. • Data gaps were found in the reporting of the Quarterly – Water Quality Monitoring Report – Drinking Water (public reports).	**2021-15:** By 30th June 2022, Sydney Water ensures the Quarterly – Water Quality Monitoring Report – Drinking Water (the public water quality reports) meets the requirements of the Reporting Manual to report each quarter on their performance against all health and aesthetic water characteristics and raw water operational characteristics identified in the Drinking Water Quality Management System.
10.2.3	Sydney Water must: a) compile indicators of the direct impact on the environment of Sydney Water's activities (the Environment Performance Indicators). The Environment Performance Indicators must be consistent with the performance indicators specified in the Reporting Manual with an indicator number starting with 'E'; b) monitor and compile data on the Environment Performance Indicators, including data that allows a year to year comparison of the Environment Performance Indicators; and c) report on the Environment Performance Indicators in accordance with the Reporting Manual.	Non-Compliant (Non-Material)	We have assigned Sydney Water a Non-compliant (non-material) grade for clause 4.1.3. This agrees with the auditor's finding. The non-compliance is due to errors identified in reported data. These errors impact the accuracy of reported data.	**2021-16:** By 30 June 2022, Sydney Water conducts an internal audit of its reported environmental data to provide assurance that the data is accurate and in accordance with the reporting definitions.

Source:

a) Sydney Water Corporation *Operational Audit 2020 – Report to the Minister – Compliance Report*, March 2021.

b) Atom Consulting, Sydney Water 2021 Operational Audit Report, February 2022 (Appendix D); Report on clauses audited by IPART (Appendix E);

3 Progress on previous audit findings

The previous operational audits identified areas where Sydney Water did not achieve compliance with its Licence obligations. We made recommendations to address these issues.[iii] Table 3 outlines Sydney Water's progress in implementing the recommended actions.

Of the 24 recommendations to be completed by Sydney Water, 16 were required to be completed within the audit period. Sydney Water:

- completed 12 out of the 16 outstanding recommendations
- fully closed out the 2 material non-compliances and 2 non-material non-compliances
- made progress in addressing the outstanding 4 recommendations for this audit period but did not complete these by the target dates.

The 4 overdue recommendations relate to compliant (minor shortcomings) grades and are considered low risk.

These 4 overdue recommendations, and the 8 recommendations that are due for completion after the 2021 audit period, will be audited in the 2022 audit period.

Table 3 Sydney Water's progress in 2021 to address our recommendations from the previous audits[9]

Licence clause	Compliance Grade	Recommendation	Progress
2.1.1 Water Quality Management System (Drinking water)	Compliant (minor shortcomings)	**2019-01:** By 30 June 2020, establish a documented procedure for evaluating the chlorine solution used in the networks maintenance activities and for evaluating the associated supplier(s).	Complete
1.7.1 Licence and licence authorisations (Pricing)	Non-Compliant (Non-Material)	**2020-01:** By 28 February 2021 (in advance of the updating of charges for the next financial year), Sydney Water must review its operating procedures to ensure that they reflect the requirements relating to any uplift charges for the Sydney Desalination Plant (noting that the 1 July 2020 Determination has different mechanisms for the uplift charge) and update these procedures as required. Sydney Water should also raise awareness around uplift charging requirements for relevant staff, where appropriate.	Complete
3.1.1 Economic approach for water conservation (water conservation program)	Non-Compliant (Non-Material)	**2020-02:** Sydney Water must update the Water Conservation Report to include more information on the development, delivery and monitoring of the program. This should include more information on how projects are first identified from the wide range of potential options, assessment of project effectiveness and monitoring of benefits. Sydney Water must develop the structure of this report and content to be included in time for the next water conservation report for the 2020-21 year.	Ongoing Sydney Water has not provided all of the detail expected in the Reporting Manual within the Water Conservation Report. Therefore, while Sydney Water has made progress, the recommendation has not been fully addressed at this time. The next appropriate date to test this recommendation is submission of the 2021/22 Water Conservation Report.
		2020-03: By 30 June 2021, Sydney Water must demonstrate measures that have been taken in the 2020-21 financial year to improve its systems and processes used to deliver the water conservation program, including program monitoring and corrective action processes.	Complete
3.1.2	Non-Compliant (Material)	**2020-04:** Sydney Water must identify, assess, and include where appropriate measures for reducing leakage to below the economic level within its water conservation program. This should be completed for inclusion in the 2021-22 water conservation program.	Complete

[9] Note that this table does not address progress on Recommendations from the Cyber Security Management System audit conducted in 2020.

Licence clause	Compliance Grade	Recommendation	Progress
3.2.4	Non-Compliant (Material)	Recommendation 2020-04 addresses the deficiency related to implementing the water conservation program.	Complete
4.1.1 Water Quality Management System (Drinking water)	Compliant (minor shortcomings)	**2020-05:** By 31 March 2021, Sydney Water must document the scope of the drinking water annual operational risk assessment reviews, and ensure that a NSW Health representative is present during assessment of public health risks.	Complete
		2020-06: By 30 June 2021, Sydney Water must review the Corporate Risk Matrix to rectify inconsistencies between Public Health and Injury / Illness consequence descriptors, including liaison with NSW Health.	Ongoing Examples relating to public health descriptors have been updated to align with the Public Health consequences in the Corporate Risk Matrix. Sydney Water have agreed with NSW Health to undertake a more holistic review of the Public Health descriptors and involve NSW Health in this review. The review is still progressing. This recommendation remains open and will be checked for completion at the next operational audit.
		2020-07: By 31 March 2021, Sydney Water must formalise the process for how the updated risk matrix and risk procedure is being implemented across water supply systems, including resolving inconsistencies in superseded documentation references, particularly noting the IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water procedures.	Ongoing Sydney Water has been progressing this recommendation, however updated risk matrix has not yet been implemented. This recommendation remains open and will be checked for completion at the next operational audit.
4.1.3 Water Quality Management System (Drinking water)	Compliant (minor shortcomings)	**2020-05:** By 31 March 2021, Sydney Water must document the scope of the drinking water annual operational risk assessment reviews, and ensure that a NSW Health representative is present during assessment of public health risks.	Complete

Licence clause	Compliance Grade	Recommendation	Progress
		2020-08: By 30 June 2021, Sydney Water must establish processes for identifying and actioning improvement items identified in risk assessments to ensure timely resolution. After Sydney Water has established these processes, update the Product Management Improvement Framework.	Ongoing Sydney Water is progressing the development of a Consolidated Action Plan to collate the actions from the risk assessments and track their progress. This recommendation remains open and will be checked for completion at the next operational audit.
4.2.1 Water Quality Management System (Recycled water)	 Compliant (minor shortcomings)	**2020-09:** By 30 June 2021, Sydney Water must document the procedure for undertaking annual recycled water operational risk assessment reviews.	Complete
		2020-10: By 31 March 2021, Sydney Water must ensure risk assessment documentations (including workshop reports and the operational risk assessment procedure) refer to the current Risk Management Procedure and Risk Matrix.	Complete
		2020-11: By 30 September 2021, Sydney Water must update critical control point documentation for the audited WRP to document the basis for the CCT low flow critical control point.	Ongoing Sydney Water plans to review the CCT low flow setpoint during the review of the audited WRP RWQMP. This has been delayed due to COVID-19 and the revised timeframe is December 2021. Sydney Water proposes to remove the CCT low flow setpoint as a critical control point (CCP). It is included to protect pumps and is not related to recycled water quality. This recommendation remains open and will be checked for completion at the next operational audit.
		2020-12: By 31 December 2021, Sydney Water must update scheme specific referencing in recycled water quality management plans that are scheduled for review in the next audit period to include reference to scheme specific documentation, including the audited Recycled Water Quality Management Plan. Include an action in the Recycled Water Improvement Register to update all scheme specific plans with this information at their scheduled review.	Ongoing Sydney Water advised that no RWQMP updates have been completed in the audit period. There has been some delay due to COVID-19. This recommendation remains open and will be checked for completion at the next operational audit.
		2020-13: By 31 December 2021, Sydney Water must update the recycled water audit schedule to ensure an annual review of high risk AGWR elements at a number of recycled water schemes each year (as agreed with NSW Health). The schedule should be risk-based and consider locations and exposures. All recycled water schemes should be audited within a 3-year cycle.	Ongoing Sydney Water have developed a spreadsheet detailing criterion for prioritising recycled water scheme audits. However, there is no procedure for how the criteria are to be applied. This recommendation remains open and will be checked for completion at the next operational audit.

Licence clause	Compliance Grade	Recommendation	Progress
		2020-14: By 30 June 2021, Sydney Water must review and update the Product Management Improvement Framework to explicitly reference recycled water. Establish processes for identifying and actioning action items in risk assessment to ensure timely resolution and update the Product Management Improvement Framework.	Complete
4.2.3 Water Quality Management System (Recycled water)	 Compliant (minor shortcomings)	**2020-15:** By 30 June 2021, Sydney Water must review permissions and limits in SCADA to ensure that changes outside critical limits can only be made in accordance with an appropriate change management procedure and that critical limits align with the critical control point documentation for all plants.	Ongoing This action was not completed by the target date due to underestimation of the approvals required and the timing needed to complete SCADA changes. Sydney Water has advised the updated completion date is January 2022. This recommendation remains open and will be checked for completion at the next operational audit.
		2020-16: By 30 June 2021, Sydney Water must formalise the review of the recycled water verification report, to be explicit about the need to manually check that exceptions are included in the Irrigation Scheme Monthly reports, and train staff in the updates.	Complete
5.1.1 Water continuity standard	 Non-Compliant (Non-Material)	**2020-17:** By 30 June 2021, Sydney Water must provide an updated analysis of its understanding of the relationship between prevailing weather conditions in the last five years, soil moisture and the impact on water main bursts, leaks and unplanned supply interruptions.	Complete
		2020-18: By 31 December 2021, Sydney Water must complete lessons learned reports for the five largest unplanned water supply interruption events that occurred in 2019-20 and identify what measures could be implemented in future to reduce the number of properties impacted by future interruptions at these locations. Sydney Water should demonstrate how it has considered the application of these lessons learned across its entire network.	Ongoing On track for completion by due date
5.2.5 Water pressure standard	 Non-Compliant (Non-Material)	**2020-19:** By 31 March 2021, Sydney Water must update its business process manual to fully and accurately include low pressure clusters.	Complete
5.5.2 Asset management clause	 Non-Compliant (Non-Material)	**2020-20:** By 31 December 2021, Sydney Water must review its inspection programs for all asset classes to incorporate lessons learned from its current inspection program for sewage pumping stations. The output should be an updated condition assessment strategy (or similar) document(s) that specifies the desired approach to condition assessments for all major asset classes including (but not limited to): • consideration of risk of asset failure and consequence of failure • frequency of inspection	Ongoing On track for completion by due date

Licence clause	Compliance Grade	Recommendation	Progress
		• level of inspection (visual v detailed inspection) and situations where more detailed inspections are warranted • inspection techniques • resourcing and support considerations such as access and shutdowns.	
10.2.2 Reporting	 Non-Compliant (Non-Material)	**2020-21:** By 31 March 2021, Sydney Water must ensure that all information required for annual compliance reporting is provided, including: critical control breaches for all plants, whether automated or manually monitored; assessment of the performance of critical control points over the long-term; and the proposed water quality management activities and programs, including expected outcomes, scope and timetable for completion.	Complete
		2020-22: Sydney Water must include detailed and quantitative discussion regarding the drivers for observed performance and variances to historical performance for all Performance Standards in the Performance Standards Report. This should be implemented for the next Performance Standards Report which will be for the 2020-21 year. Under Sydney Water's Reporting Manual, the Performance Standards Report is due for submission by 1 September following the end of the relevant financial year (i.e., 1 September 2021).	Ongoing Sydney Water has not yet adequately addressed the requirements of this recommendations nor the requirements of the reporting manual for the performance standards report. The report still contains discussion of various initiatives that Sydney Water is undertaking to improve service interruptions performance. However, the discussion of these initiatives typically has little critical analysis regarding the potential or actual influence of these initiatives on performance and appear to distract from the intention of the performance standards report. This recommendation remains open and will be checked for completion at the next operational audit.
10.2.4 Reporting	 Compliant (minor shortcomings)	**2020-23:** By 30 June 2021, Sydney Water must improve document control of the records held in its systems by ensuring that information such as the version date, version number, change history and document author are included in all records.	Ongoing Sydney Water is realigning and simplifying its various management system into a "One Management System" approach. However, 15% of controlled documents in Sydney Water's document system are expired. This recommendation remains open and will be checked for completion at the next operational audit.

Source:

a) Sydney Water Corporation *Operational Audit 2020 – Report to the Minister – Compliance Report*, March 2021.

b) Atom Consulting, Sydney Water 2021 Operational Audit Report, February 2022 (Appendix D); Report on clauses audited by IPART (Appendix E);

Note: grey shaded rows denote licence clauses where all non-compliances or shortcomings have been fully addressed.

Appendices

A Compliance grades

Table A.1 Current compliance grades

Compliance grade	Description
 Compliant	Sufficient evidence is available to confirm that the requirements have been met.
 Compliant (minor shortcomings)	Sufficient evidence is available to confirm that the requirements have been met apart from minor shortcomings which to date have not compromised the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.
 Non-compliant (non-material)	Sufficient evidence is not available to confirm that the requirements have been met and the deficiency does not adversely impact the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.
 Non-compliant (material)	Sufficient evidence is not available to confirm the requirements have been met and the deficiency does adversely impact the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.
 No Requirement	There is no requirement for the utility to meet this criterion within the audit period.

Source: IPART Audit Guideline Public Water Utilities, July 2019, Figure 2.1.

B Audit process

B.1 Audit programme

We apply our Compliance and Enforcement Policy in developing the annual audit scopes.[4] The policy explains our risk-based regulatory model. Under the policy, we can:

- focus on allocating resources to areas of higher risk
- increase our efficiency in undertaking audits
- tailor our enforcement response.

Our risk-based approach centres around evaluating the risk that each part of our regulatory function aims to reduce. We evaluate risks by considering the likelihood of harm occurring in the absence of our regulatory controls and the potential consequence of that harm. We then consider how likely it is that a regulated entity will not properly implement a regulatory control.

We identify and document historical, current and emerging risks. This allows us to allocate resources proportionately to the risk and complexity of a regulated entity and its behaviours.

The audit process involves receiving and reviewing reports, undertaking and attending audit interviews with Sydney Water staff, and undertaking field verification to investigate how effectively the requirements of the licence are met in practice. This year, we undertook these interviews remotely while field verification visits were undertaken by a combination of physical and virtual inspections.

B.2 2021 audit scope

We do not audit all licence clauses annually. Instead we adopt a risk-based audit approach, which means we audit 'high risk' clauses more frequently and 'low risk' clauses less frequently. We conduct audits in accordance with our Public Water Utility Audit Guideline.[5]

The audit scope for Sydney Water's 2021 audit included obligations on:

- Licence context (Part 1) – requirements on pricing and licence availability.
- Obligations to make services available (Part 2) – supply of drinking water and disposal of wastewater.
- Water conservation and planning (Part 3) – requirements on water conservation and water planning activities.
- Performance standards for water quality (Part 4) – requirements on drinking water, recycled water and fluoridation.
- Performance standards for service interruptions (Part 5) – requirements on service continuity and system performance standards, and asset management systems.
- Customers and consumers (Part 6) – requirements on providing information, internal complaints handling, and external dispute resolution.

- Memoranda of understanding (Part 7) – MOU obligations with Fire and Rescue NSW.
- Information and services for competitors (Part 8) – publishing service information.
- Performance monitoring and reporting (Part 10) – requirements on operational audits, information provision and reporting.

The audit scope is in Appendix C.

We also consulted with NSW Health, Environment Protection Authority (EPA), Fire and Rescue NSW (FRNSW), and Department of Planning, Industry and Environment (DPIE) and sought public submissions to determine the scope of the audit. We received submissions from NSW Health, Environment Protection Authority (EPA), Fire and Rescue NSW (FRNSW), and Department of Planning, Industry and Environment (DPIE). We did not receive any public submissions.

We had regard to the following comments in finalising the audit scope:

- NSW Health suggested the following be considered:
  - The impact to operations from product specification contracts between Sydney water and water filtration operators.
  - Review of plans and procedures for equipment failure and installation of temporary equipment.
  - Review progress of repair work and timeline for replacement for Potts Hill reservoir roof.
  - Maturity of Sydney water's emergency management under Element 6 of the ADWG framework.
  - Potential risks from backflow and cross connection of drinking water services.
  - Review proposed design and operation of Colebee recycled water scheme to ensure pathogen reduction levels are met.
- FRNSW provided comments on Sydney Water's commitment and actions in relation to their joint MOU, particularly in areas where FRNSW are not completely satisfied.
- EPA commented on occasions where Sydney Water had not met dry weather sewage overflow requirements in its environment protection licences.

B.3 2021 audit plan

We engaged Atom to undertake the 2021 Sydney Water audit.

We held a project start-up meeting with the auditor on 20 July 2021 to agree on the project milestones, audit timing, and outline our expectations. We participated in the audit inception meeting with Sydney Water and the auditor on the first day of the audit interviews, on 15 September 2021. At this meeting, we agreed on expectations and protocols for the conduct of the audit. All parties adhered to the agreed protocols throughout the audit.

We required the auditor to undertake the following tasks:

1. review stakeholder submissions

2. prepare an information request (questionnaire) setting out all the requirements for information and evidence, at least two weeks prior to the commencement of audit interviews (for this audit, the auditor issued the questionnaire 6 weeks before the audit interviews commenced)
3. review reports and documents provided by Sydney Water in response to the questionnaire
4. conduct interviews with Sydney Water staff as appropriate[6]
5. conduct field verification to assess the implementation of Sydney Water's systems and procedures
6. assess the level of compliance (in line with our compliance grades) Sydney Water achieved for each of the identified Licence obligations, and provide supporting evidence for this assessment
7. assess and report on progress by Sydney Water in addressing any comments made by the relevant Minister and/or our recommendations from previous audits, providing supporting evidence for these assessments
8. verify the calculation of performance indicators associated with requirements of the relevant licence and assess trends in performance arising from these indicators
9. provide draft audit reports to us and address comments from Sydney Water and us regarding draft audit findings
10. prepare and submit a final report outlining audit findings (Appendix D).

The auditor adopted a methodology consistent with *ISO 19011 Guidelines for Auditing Management Systems*. This guideline defines the requirements of an audit, ensuring that it is conducted in accordance with an established and recognised audit protocol. Where appropriate, the auditor also sought guidance from *ISO 55001:2014 Asset management system – Requirements*.

The auditor also carried out the audit according to our Audit Guideline.[7] The auditor can make recommendations or suggest opportunities for improvement under the guideline.

Where we support an auditor's recommendation, we make a recommendation based on the auditor's recommendation. Our recommendations are summarised in Table 2 of this report.

Where the auditor suggests opportunities for improvement, Sydney Water can decide whether to implement these suggestions. This approach aims to balance improved performance with the investment required to achieve it, i.e. we want Sydney Water to first consider the pricing implications and value for money of continued improvement. Therefore, while we encourage Sydney Water to consider the auditor's suggestions, we do not follow these up. The auditor's suggested opportunities for improvement are included in the auditor's report in Appendix D.

The auditor conducted audit interviews from 15 September 2021 to 22 September 2021 remotely using online video conferencing facilities. The auditor conducted an in-person inspection of a reactive maintenance pipe repair on 7 September 2021. On 16 September 2021, the auditor also undertook a virtual site visit to the following locations:

- Macarthur Water Filtration Plant
- Liverpool Water Recycling Plant

The auditor assessed Sydney Water's compliance with the relevant requirements of the Licence per the compliance grades outlined in Appendix A.

C 2021 audit scope

2021 operational audit scope
Sydney Water Corporation

2021 audit scope

This document sets out the 2021 operational audit scope for Sydney Water Corporation (Sydney Water).

Auditors should note any directions in the comments column of Table 2.

Audit period

The audit period is 1 July 2020 to 30 June 2021. Sydney Water will be audited for the full period against the 2019-2023 operating licence. We expect that interviews for the audit will be held in September 2021. However, this is subject to change depending on auditor availability.

Outstanding audit recommendations

Table 3 outlines outstanding audit recommendations. The auditor is required to review these recommendations to determine progress. We report on outstanding audit recommendations separately within IPART's operational audit report to the Minister.

Statement of compliance

The utility is required to provide a Statement of Compliance (SC), signed by the CEO and a Board Member, by 1 September. The SC is an exception based report that outlines any non-compliance with licence conditions during the previous financial year. It also identifies what remedial action has been, or is being taken, with respect to these non-compliances.

The SC covers all licence conditions regardless of whether they are scheduled to be audited in that year. The SC may cause a late variation to the audit scope to allow non-compliances to be reviewed if necessary.

Interpretation

In the case of any discrepancies between the Sydney Water Operating Licence 2019-2023 (licence) and the audit scope, the licence will prevail.

Field verification locations

Table 4 lists the locations that we have visited in previous audits. Together with Sydney Water, we will determine the locations that we will visit in the 2021 audits and advise the auditor before the field verification visits are scheduled to commence.

Table 1 Key

Requirement	Meaning
Audit/Internal IPART check	Audit/check clause in the 2021 audit
SC	Audit of this clause not required in the 2021 audit unless the utility's Statement of Compliance identifies a non-compliance or we become aware of other reasons to audit the clause.
NR	No requirement for audit.

Table 2 2021 Audit scope for Sydney Water Corporation

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
1	Licence and licence authorisation		
1.1	Objectives of this licence		
1.1.1	The objectives of this Licence are to: a) authorise and require Sydney Water, within its Area of Operations, to: i. store or supply water ii. provide sewerage services iii. provide Stormwater Drainage Systems; and iv. dispose of Wastewater; and b) set efficient and effective terms and conditions, including quality and performance standards, that require Sydney Water to provide services in a way that: i. supports its principal objectives under the Act to protect public health and the environment; ii. supports its principal objective under the Act to be a successful business, including by having regard to the interest of the community; and iii. does not prevent or hinder competition.	NR	Objective clause
1.2	Area of operations		
1.2.1	This Licence applies to the Area of Operations specified in Schedule A.	NR	Information clause
1.2.2	Sydney Water must publish on its website a map of its Area of Operations by 31 December 2019 (or another date approved by IPART in writing). Sydney Water must update the map within 30 days of any change to its Area of Operations.	NR	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
1.3	Term of this licence		
1.3.1	The term of this Licence is four years from the Commencement Date. [Note: On and from the Commencement Date, this Licence replaces any previous version of the operating licence granted to Sydney Water under section 12 of the Act.]	NR	Information clause
1.4	Licence amendment		
1.4.1	Subject to the Act and clause 1.4.2, the Governor may amend or substitute this Licence by notice in the New South Wales Government Gazette.	NR	
1.4.2	Before notice of a proposed amendment to this Licence is tabled in Parliament under section 16 of the Act, the Minister must provide Sydney Water with reasonable notice of the proposed amendment to enable it to comply with the amendment if it takes effect. [Note: The Customer Contract may be varied in accordance with section 59 of the Act and clause 14.2 of the Customer Contract. Such a variation is not an amendment to this Licence for the purpose of section 16 of the Act.].	NR	
1.5	Non-exclusive licence		
1.5.1	This Licence does not prohibit any other person from providing services in the Area of Operations that are the same as, or similar to, the Services, if the person is lawfully entitled to do so.	NR	Information clause
1.6	Availability of licence		
1.6.1	Sydney Water must make a copy of this Licence available to any person, free of charge: a) on its website; and b) upon request made to the Contact Centre.	Internal IPART check	This clause is not included in the auditor's scope.
1.7	Pricing		
1.7.1	Sydney Water must set the level of fees, charges, and other amounts payable for its Services in accordance with: a) the terms of the Licence; b) the Act; and c) any applicable maximum prices or methodologies for fixing maximum prices determined under the IPART Act.	Audit	In the 2020 audit, we assigned Sydney Water a Non-compliant (non-material) grade for this clause. We consider Sydney Water has a low level of compliance with this clause as it was previously Non-Compliant in 2015, 2016, 2017 and 2018 (previous licence). Auditor should check the following Recommendation (see table 3): - 2020-01.

<table>
<tr><th>Licence clause</th><th>Operating Licence obligation</th><th>2021 audit requirement</th><th>Comments for the auditor</th></tr>
<tr><td>1.8</td><td>End of Term Review</td><td></td><td></td></tr>
<tr><td>1.8.1</td><td>IPART intends to review this Licence in its final year to investigate:
a) whether this Licence is fulfilling its objectives; and
b) any issues that have arisen during the term of this Licence that may impact its effectiveness,
(the End of Term Review).</td><td>NR</td><td>Information clause</td></tr>
<tr><td>1.8.2</td><td>To assist IPART with the End of Term Review, Sydney Water must provide IPART with such information as IPART reasonably requires. Sydney Water must provide IPART with such information as IPART requests within a reasonable time.</td><td>NR</td><td></td></tr>
<tr><td>1.9</td><td>Notices</td><td></td><td></td></tr>
<tr><td>1.9.1</td><td>Any notice or other communication given under this Licence must be:
a) in writing addressed to the intended recipient; and
b) delivered or sent to one of the addresses specified below (or the last address notified by the recipient), unless otherwise specified in the Reporting Manual.
<table><tr><th>Sydney Water</th><th>Minister</th><th>IPART</th></tr><tr><td>Sydney Water
The Managing Director
Sydney Water
1 Smith Street
Parramatta NSW 2150</td><td>The Hon. Melinda Pavey MP
GPO Box 5341
Sydney NSW 2001</td><td>The Chief Executive Officer
Independent Pricing and Regulatory Tribunal
Level 15, 2-24 Rawson Place
Sydney NSW 2000</td></tr></table></td><td>NR</td><td></td></tr>
<tr><td>1.9.2</td><td>Any requests for approval under the following clauses must be made by Sydney Water's Managing Director: 1.2.2, 3.1.7, 3.2.1, 3.2.6, 6.5.1, 6.6.6, 8.2.2, 8.2.3, 8.2.5, 8.2.6, 9.1.1, 8 or 9.3.1.</td><td>NR</td><td></td></tr>
<tr><td>2.1</td><td>Licence authorisations</td><td></td><td></td></tr>
<tr><td>2.1.1</td><td>This Licence authorises and requires Sydney Water to provide, construct, operate, manage and maintain efficient, co-ordinated and commercially viable systems and services for providing the following Services within the Area of Operations:
a) storing and supplying water;
b) providing sewerage services; and
c) disposing of Wastewater.</td><td>NR</td><td>Licence authorisation clause</td></tr>
</table>

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
2.1.2	This Licence authorises and requires Sydney Water to provide, operate, manage and maintain a Stormwater Drainage System as described in section 14(1)(b) of the Act, except to the extent that the Minister is satisfied under sections 14(4) and 14(5) of the Act that satisfactory arrangements have been made for the applicable Service to be provided by another appropriate body.	NR	Licence authorisation clause
2.1.3	This Licence authorises (but does not require) Sydney Water to provide, construct, operate, manage and maintain efficient, co-ordinated and commercially viable Stormwater Drainage Systems (and Services for providing those Stormwater Drainage Systems) within the Area of Operations in excess of the Stormwater Drainage System it is required to provide, operate, manage and maintain under clause 2.1.2. This includes increasing the capacity of the Stormwater Drainage System included in the business undertaking transferred under Part 3 of the Act from the Water Board to Sydney Water as at the date of the transfer of the business undertaking. [Note: For the avoidance of doubt, the provision, management and maintenance of Stormwater Drainage Systems (and Services for providing those Stormwater Drainage Systems) under clause 2.1 may include stormwater quality management and other measures as necessary to manage impacts of stormwater on waterway health.]	NR	Licence authorisation clause
2.2	Obligation to make services available		
2.2.1	Sydney Water must ensure that Services for the supply of Drinking Water and disposal of Wastewater are available on request for connection to any Property situated in the Area of Operations for which a connection is available.	Audit	
2.2.2	Sydney Water must provide Services for the supply of Drinking Water and disposal of Wastewater on request to any licensee under the WIC Act, where that licensee is connected to (or where a connection is available in respect of that licensee to) Sydney Water's water supply system or sewerage system.	Audit	
2.2.3	Connection to Sydney Water's systems for the provision of Services for the supply of Drinking Water and disposal of Wastewater is subject to any reasonable conditions that Sydney Water may determine to ensure the safe, reliable and financially viable supply of Drinking Water and disposal of Wastewater to Properties.	NR	Authorisation clause

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
3.1	Economic approach for water conservation		
3.1.1	Sydney Water must maintain a water conservation program consistent with the Current Economic Method.	Audit	In the 2020 audit we assigned Sydney Water a Non-compliant (non-material) grade for this clause. The audit found that the water conservation program was lacking aspects of a well-formed program; it lacked details on the governance and controls for identification and inclusion of projects within the program and monitoring their delivery and benefits. Auditor should check the following Recommendations (see table 3): - 2020-02 and - 2020-03.
3.1.2	Sydney Water must implement water conservation measures that have been assessed as economic as determined by the Current Economic Method.	Audit	In the 2020 audit we assigned a non-compliant (material) grade to this clause. The auditor noted the substantial under-delivery of the water conservation program by Sydney Water, particularly in relation to reducing leakage to below the economic level. Auditor should check the following Recommendation (see table 3): - 2020-04.
3.1.3	Sydney Water must make: a) a copy of the Current Economic Method; b) a plain English summary of the Current Economic Method; and c) the economic level of water conservation (expressed as the value of water in dollars per kilolitre and as the quantity of savings in megalitres per day) determined in accordance with the Current Economic Method, available: d) to any person, free of charge upon request made to the Contact Centre; and e) on Sydney Water's website.	Internal IPART check	This clause is not included in the auditor's scope.
3.1.4	Sydney Water must update the economic level of water conservation using the Current Economic Method: a) for the purposes of clause 3.1.1 and 3.1.2—annually; and b) or the purposes of clause 3.1.3(c)—monthly.	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
3.1.5	The Minister may, at any time during the term of this Licence and in writing, direct Sydney Water to revise the Current Economic Method in any way the Minister requires. [Note: The Minister may request IPART to undertake a review of the Current Economic Method during the term of this Licence. Such review may precede a direction given under clause 3.1.5.]	NR	Information clause
3.1.6	Sydney Water must submit to the Minister the Current Economic Method revised in accordance with the written direction within: a) 30 days of receipt of that direction; or b) any other timeframe agreed by the Minister.	SC	
3.1.7	If the Minister approves the revised Current Economic Method, he or she will give written notice of the approval to Sydney Water.	NR	Information clause
3.2	Water Planning		
3.2.1	By 1 December 2020 (or another date approved by the Minister in writing), Sydney Water must develop, and submit to the Minister: a) a long-term capital and operational plan; and b) an emergency drought response plan.	NR	Fixed deadline requirement
3.2.2	The plans referred to in clause 3.2.1 must address any written guidance that the Minister provides to Sydney Water	NR	
3.2.3	Sydney Water must use its best endeavours to develop the plans referred to in clause 3.2.1 in cooperation with Water NSW.	NR	
3.2.4	Sydney Water must implement any action that: a) Sydney Water is responsible for delivering under the Metropolitan Water Plan; or b) the Minister directs, in writing, Sydney Water to implement.	Audit	In the 2020 audit we assigned a non-compliant (material) grade to this clause. Auditor should check the following Recommendation (same recommendation as for cl 3.1.2) (see table 3): - 2020-04.
3.2.5	Sydney Water must participate cooperatively in any review of the Metropolitan Water Plan.	SC	
3.2.6	Sydney Water must develop and enter into a data sharing agreement with DPE by the Commencement Date (or another date approved by the Minister in writing) to assist in the development and review of the Metropolitan Water Plan (the Data Sharing Agreement)	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
3.2.7	In addition to any other matters agreed by Sydney Water and DPE, the Data Sharing Agreement must: a) set out the roles and responsibilities of Sydney Water and DPE under the Data Sharing Agreement; b) set out the types of data that are covered by the Data Sharing Agreement; c) set out the purposes for the sharing of data and information; d) set out the requirements that shared data and information must meet; e) identify agreed timelines and the format for sharing data and information; and f) identify procedures for resolving matters of conflict in providing data and information.	SC	
3.2.8	Once Sydney Water has entered into the Data Sharing Agreement it must comply with the Data Sharing Agreement.	SC	
3.2.9	Sydney Water must provide any data or information requested by the Minister in writing: a) by the date specified by the Minister; and b) to the Minister or, if the Minister so directs, to DPE.	NR	
3.3	Priority Sewerage Program		
3.3.1	Sydney Water must participate cooperatively in any NSW Government review of the Priority Sewerage Program.	SC	
3.3.2	If required by the Minister, Sydney Water must implement and comply with any outcomes (including timeframes) of any NSW Government review of the Priority Sewerage Program. [Note: The areas to which the Priority Sewerage Program applies are Austral, Menangle, Menangle Park, Nattai, Scotland Island and Yanderra as listed in Schedule B of this Licence.]	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
4.1	Drinking Water		
4.1.1	Sydney Water must maintain a Management System that is consistent with the Australian Drinking Water Guidelines and any requirements relating to Drinking Water specified by NSW Health (the Drinking Water Quality Management System)	Audit	In the 2020 audit, we assigned Sydney Water a Compliant (Minor Shortcomings) grade for this clause. We audited elements 2, 3, 4, 5, 6, 7, 10, 11 and 12. **This year we will audit elements 1-6, 8, 9 and 10.** We sought NSW Health comment on Sydney Water's performance against this clause and for input into the elements of the ADWG that should be audited. Refer submission from NSW Health for further information. H21/139925. Auditor should check the following Recommendations (see table 3): - 2020 05, - 2020 06 and - 2020 07.
4.1.2	In the event of inconsistency between the requirements specified by NSW Health referred to in clause 4.1.1 and the Australian Drinking Water Guidelines, the requirements specified by NSW Health prevail.	NR	Information clause

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
4.1.3	Sydney Water must ensure that the Drinking Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Drinking Water Quality Management System and to the satisfaction of NSW Health. [Note: Sydney Water is to apply the Drinking Water Quality Management System to the Drinking Water system under its control, having regard to the entire Drinking Water supply system – from the water catchment to the Consumer.]	Audit	In the 2020 audit, we assigned Sydney Water a Compliant (Minor Shortcomings) grade for this clause. We audited elements 2, 3, 4, 5, 6, 7, 10, 11 and 12. **This year we will audit elements 1-6, 8, 9 and 10.** We sought NSW Health comment on Sydney Water's performance against this clause and for input into the elements of the ADWG that should be audited. Refer submission from NSW Health for further information. H21/139925. Auditor should check the following Recommendations (see table 3): - 2020-05 (same Rec as for cl 4.1.1), and - 2020-08.
4.2	Recycled Water		
4.2.1	Sydney Water must maintain a Management System that is consistent with the Australian Guidelines for Water Recycling and any requirements relating to water recycling specified by NSW Health (the Recycled Water Quality Management System).	Audit	In the 2020 audit, we assigned Sydney Water a Compliant (Minor Shortcomings) grade for this clause. We audited elements 2, 3, 4, 5, 6, 7, 10, 11 and 12. **This year we will audit elements 1-6, 10, 11 and 12.** We sought NSW Health comment on Sydney Water's performance against this clause and for input into the elements of the ADWG that should be audited. Refer submission from NSW Health for further information. H21/139925. Auditor should check the following Recommendations (see table 3): - 2020-09, - 2020-10, - 2020-11, - 2020-12, - 2020-13, and - 2020-14.

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
4.2.2	In the event of inconsistency between the requirements specified by NSW Health referred to in clause 4.2.1 and the Australian Guidelines for Water Recycling, the requirements specified by NSW Health prevail.	NR	Information clause
4.2.3	Sydney Water must ensure that the Recycled Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Recycled Water Quality Management System and to the satisfaction of NSW Health.	Audit	In the 2020 audit, we assigned Sydney Water a Compliant (Minor Shortcomings) grade for this clause. We audited elements 2, 3, 4, 5, 6, 7, 10, 11 and 12. **This year we will audit elements 1-6, 10, 11 and 12.** We sought NSW Health comment on Sydney Water's performance against this clause and for input into the elements of the ADWG that should be audited. Refer submission from NSW Health for further information. H21/139925. Auditor should check the following Recommendations (see Table 3): - 2020-15, and - 2020-16.
4.3	Fluoridation Code		
4.3.1	Sydney Water must comply with the Fluoridation Code and any requirements for fluoridation specified by NSW Health.	Audit	IPART to contact NSW Health to comment on Sydney Water's performance against this clause.
4.3.2	In the event of inconsistency between the requirements specified by NSW Health referred to in clause 4.3.1 and the Fluoridation Code, the requirements specified by NSW Health prevail.	NR	Information clause
5.1	Water Continuity Standard		
5.1.1	Sydney Water must ensure that, in each financial year, at least 9,800 Properties per 10,000 Properties (in respect of which Sydney Water provides a Drinking Water supply service) receive a Drinking Water supply service unaffected by an Unplanned Water Interruption (the Water Continuity Standard).	Audit	In the 2020 audit, we assigned Sydney Water a Non-Compliant (Non-Material) grade for this clause. Sydney Water self-reported this non-compliance. It is a repeat non-compliance (also non-compliant (non-material) in 2019). **Auditor** should check the following Recommendations (see Table 3): - 2020-17 and - 2020-18

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
5.1.2	Sydney Water must use: a) the Water Continuity Optimal Level; and b) the Water Continuity Tolerance Band, as inputs to decisions regarding the design, construction, operation and maintenance of its water supply system.	SC	
5.1.3	For the purposes of clause 5.1.2: a) the Water Continuity Optimal Level is 9,840 Properties per 10,000 Properties (in respect of which Sydney Water provides a Drinking Water supply service) in each financial year receiving a Drinking Water supply service unaffected by an Unplanned Water Interruption; and b) the Water Continuity Tolerance Band is the band of deviations from the Water Continuity Optimal Level between: i. the mandatory Water Continuity Standard (specified in clause 5.1.1 above); and ii. an upper bound of 9,880 Properties per 10,000 Properties (in respect of which Sydney Water provides a Drinking Water supply service) in each financial year receiving a Drinking Water supply service unaffected by an Unplanned Water Interruption. [Note: Clause 5.1.2 requires Sydney Water to use the Water Continuity Optimum Level and Water Continuity Tolerance Band as inputs into certain decisions. If Sydney Water complies with clause 5.1.2, it will be compliant with this clause 5.1 even if the number of Properties unaffected by an Unplanned Water Interruption exceeds the upper bound of the Water Continuity Tolerance Band. However, IPART may consider the prudency and efficiency of any expenditure related to this level of performance at the next review of Sydney Water's prices.]	NR	Information clause
5.1.4	Sydney Water must use the best available data (taking account of water pressure data, where available) to determine whether a Property has experienced an Unplanned Water Interruption.	Audit	To be audited in unison with clause 5.1.1.
5.1.5	If a Property experiences an Unplanned Water Interruption that was caused by a Third Party or a power failure, the Property is taken not to have experienced an Unplanned Water Interruption for the purposes of this clause 5.	NR	Information clause

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
5.1.6	For the purpose of the Water Continuity Standard, Water Continuity Optimal Level and Water Continuity Tolerance Band: a) each separately billed part of a Multiple Occupancy Property is to be counted as a separate Property; and [Note: For example, a complex of five townhouses where each townhouse receives a separate Bill from Sydney Water is to be counted as five separate Properties. However, a block of five flats that only receives one Bill from Sydney Water is to be counted as a single Property.] b) each separate instance, in a financial year, of a single Property experiencing an Unplanned Water Interruption is to be counted as a separate Property that has experienced an Unplanned Water Interruption.	NR	Information clause
5.2	Water Pressure Standard		
5.2.1	Sydney Water must ensure that, in each financial year, at least 9,999 Properties per 10,000 Properties (in respect of which Sydney Water provides a Drinking Water supply service) receive a Drinking Water supply service affected by fewer than 12 Water Pressure Failures (the Water Pressure Standard).	SC	
5.2.2	A Property is taken to have experienced a Water Pressure Failure when: a) a person notifies Sydney Water that the Property has experienced a Water Pressure Failure and Sydney Water confirms that the Property has experienced a Water Pressure Failure; or b) Sydney Water identifies that the Property has experienced a Water Pressure Failure (including through its data collection systems and hydraulic analysis).	NR	Information clause
5.2.3	A Property will not be taken to have experienced a Water Pressure Failure if that Water Pressure Failure occurred only because of: a) water usage in the case of a fire or other abnormal demand; or b) a short term or temporary operational problem (such as a main break), including where caused by a Third Party, that is remedied within four days of its commencement.	NR	Information clause

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
5.2.4	For the purpose of the Water Pressure Standard: a) where a Property experiences multiple Water Pressure Failures in a day, only one of those Water Pressure Failures is to count as a Water Pressure Failure experienced by that Property; b) where a Property experiences a Water Pressure Failure that affects more than one day, each day affected is to be counted as a separate Water Pressure Failure; c) each separately billed part of a Multiple Occupancy Property is to be counted as a separate Property; [Note: For example, a complex of five townhouses where each townhouse receives a separate Bill from Sydney Water is to be counted as five separate Properties. However a block of five flats that only receives one Bill from Sydney Water is to be counted as a single Property.] d) each Property that is affected by 12 or more Water Pressure Failures in a financial year is to be counted once only as a Property that has been affected by 12 or more Water Pressure Failures in that financial year; and e) after 30 June 2020, where a Property in, or in the vicinity of, a Property Cluster, is connected for the first time to Sydney Water's Drinking Water supply system and Sydney Water has informed the owner (at the time of connection) of: i. the risk of recurring Water Pressure Failures should the Property be connected to that system; and ii. options to reduce that risk; that Property is not to be counted for the purposes of the Water Pressure Standard.	NR	Information clause
5.2.5	For each Property Cluster, Sydney Water must: a) by 30 June 2020, review its business processes to ensure that no Property at risk of being affected by recurring Water Pressure Failures from the same cause is connected to Sydney Water's Drinking Water supply system, unless the owner (at the time of connection) is: i. informed of that risk; and ii. provided with options to reduce that risk; and b) by 31 October 2022, take steps to minimise or eliminate the risk of recurring Water Pressure Failures from that cause, in a manner that takes into account its Customers' willingness to pay for Drinking Water supply services.	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
5.3	Dry Weather Wastewater Overflow Standard		
5.3.1	Sydney Water must ensure that, in each financial year, at least: a) 9,928 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding Public Properties) receive a sewerage service unaffected by an Uncontrolled Wastewater Overflow; and b) 9,999 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding Public Properties) receive a sewerage service affected by fewer than three Uncontrolled Wastewater Overflows, (the Dry Weather Wastewater Overflow Standard).	Audit	In the 2020 audit, we assigned Sydney Water a Compliant grade for this clause. EPA notes that Sydney Water has exceeded the number of dry weather overflows permitted under its Environmental Protection Licences for 7 systems in the 2019-2020 reporting period.
5.3.2	A Property is taken to have experienced an Uncontrolled Wastewater Overflow when: a) a person notifies Sydney Water that a Property has experienced a sewage overflow, where Sydney Water later confirms that the sewage overflow is an Uncontrolled Wastewater Overflow; or b) Sydney Water's systems identify that a Property has experienced an Uncontrolled Wastewater Overflow.	NR	Information clause
5.3.3	For the purpose of the Dry Weather Wastewater Overflow Standard: a) each Multiple Occupancy Property is to be counted as a single Property; [Note: For example, a complex of five townhouses where each townhouse receives a separate Bill from Sydney Water is to be counted as a single Property.] b) for the purpose of clause 5.3.1(a), each separate instance, in a financial year, of a single Property experiencing an Uncontrolled Wastewater Overflow is to be counted as a separate Property that has experienced, in that financial year, an Uncontrolled Wastewater Overflow; and c) for the purpose of clause 5.3.1(b), each Property that experiences three or more Uncontrolled Wastewater Overflows in a financial year is to be counted once only as a Property that has experienced three or more Uncontrolled Wastewater Overflows in that financial year.	NR	Information clause

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
5.4	Interpretation of standards		
5.4.1	In the case of any ambiguity in the interpretation or application of the Water Continuity Standard, the Water Pressure Standard, the Dry Weather Wastewater Overflow Standard or clause 5.2.5, IPART's interpretation or assessment of the standard or clause will prevail.	NR	Information clause
5.5	Asset Management		
5.5.1	Sydney Water must maintain a Management System in relation to Sydney Water's Assets that is consistent with the Australian Standard AS ISO 55001:2014 Asset management – Management systems – Requirements (the Asset Management System).	SC	
5.5.2	Sydney Water must ensure that the Asset Management System is fully implemented and that all relevant activities are carried out in accordance with the Asset Management System.	Audit	In the 2020 audit, we assigned Sydney Water a Non-Compliant (Non-Material) grade for this clause. **Auditor** should check the following Recommendations (see Table 3) - 2020-20.
6.1	Customer contract		
6.1.1	The Customer Contract sets out the rights and obligations of Customers and Sydney Water in relation to the Services provided in accordance with this Licence. The Customer Contract is set out in Schedule C of this Licence.	NR	Information clause
6.1.2	Sydney Water must make a copy of the Customer Contract available to any person, free of charge: a) on its website; and b) upon request made to the Contact Centre.	Internal IPART check	This clause is not included in the auditor's scope.

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
6.2	Providing information to Customers		
6.2.1	Sydney Water must prepare one or more communications that: a) provide a brief explanation of the Customer Contract; b) summarise the key rights and obligations of Customers under the Customer Contract; c) refer to the types of account relief available for Customers experiencing financial hardship; d) outline the rights of Customers to claim a rebate and the conditions that apply to those rights; e) contain information regarding how to contact Sydney Water by telephone, email or post; and f) contain information regarding the ability of a Customer to enter into agreements with Sydney Water separate to the Customer Contract for the provision of Services by Sydney Water to the Customer.	SC	
6.2.2	Sydney Water must update the communication or communications to reflect any variations made to the Customer Contract.	SC	
6.2.3	Sydney Water must: a) provide the communication or communications and any updates, free of charge to: i. Customers at least annually with their Bills; and ii. any person upon request made to the Contact Centre; and b) make the communication or communications and any updates publicly available on its website, free of charge, within 60 days of the commencement of the Customer Contract or any communication update.	SC	
6.2.4	Sydney Water must publish on its website and advertise at least annually in a manner that Sydney Water is satisfied is likely to come to the attention of members of the public, information as to: a) the types of account relief available for Customers experiencing payment difficulty; and b) rights of Customers to claim rebates and the conditions that apply to those rights	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
6.3	Consumers		
6.3.1	Sydney Water's obligations under the following clauses of the Customer Contract are extended to Consumers as though the Consumers were parties to the Customer Contract: a) clause 5.1 (Payment difficulties and assistance options for all customers); b) clause 6.5 (Occupiers (tenants) may pay charges to avoid restriction or disconnection); c) clause 12 (If I am unhappy with the service provided by Sydney Water what can I do?); d) clause 13 (Consultation, information and privacy); and e) clause 14 (When does this contract with Sydney Water terminate?).	SC	
6.4	Assistance Options for Payment Difficulties and Actions for Non-Payment		
6.4.1	Sydney Water must maintain and fully implement: a) a payment difficulty policy that assists residential Customers experiencing payment difficulty to better manage their current and future Bills; b) procedures relating to a payment plan for residential Customers who are responsible for paying their Bills and who are, in Sydney Water's reasonable opinion, experiencing payment difficulty; c) procedures for identifying the circumstances under which Sydney Water may disconnect or restrict the supply of water to a Customer's Property; and d) provisions for self-identification, identification by community welfare organisations and identification by Sydney Water of residential Customers experiencing payment difficulty, (the Assistance Options for Payment Difficulties and Actions for Non-Payment).	SC	
6.4.2	Sydney Water must provide, free of charge, an explanation of the Assistance Options for Payment Difficulties and Actions for Non-Payment on its website and to: a) all residential Customers, at least annually with their Bills; b) residential Customers who Sydney Water identifies as experiencing payment difficulty on the date that Sydney Water first identifies that the Customer is experiencing payment difficulty; and any other person upon request made to the Contact Centre.	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
6.5	Family Violence		
6.5.1	Sydney Water must develop and implement a family violence policy by 1 July 2020 (or another date approved by IPART in writing).	SC	
6.5.2	The family violence policy must, at a minimum, provide for: a) the protection of private and confidential information; b) access to payment difficulty programs; c) processes that minimise the reliance on individuals to disclose their family violence; and d) processes for referrals to specialist services.	SC	
6.6	Customer engagement		
6.6.1	Sydney Water must undertake customer engagement to understand its customers' preferences and willingness to pay for service levels. The customer engagement must be relevant, representative, proportionate, objective, clearly communicated and accurate.	SC	
6.6.2	Sydney Water must establish and regularly consult with its Customer Council.	SC	
6.6.3	Sydney Water must provide the Customer Council with information in Sydney Water's possession or under its custody or control necessary to enable the Customer Council to discharge the tasks assigned to it, other than information or documents that are confidential or privileged.	SC	
6.6.4	Sydney Water must keep minutes of proceedings of the Customer Council and make a copy of the minutes available to any person, free of charge, upon request made to the Contact Centre.	SC	
6.6.5	Sydney Water must undertake a review of the operation of the Customer Council. The review must include an assessment of the Customer Council's role, objectives, outcomes and membership, including whether the Customer Council could be used to better support customer engagement, as required by clause 6.6.1.	SC	
6.6.6	Sydney Water must report to IPART on the completed review and its outcomes by 30 June 2020 (or another date approved by IPART in writing).	NR	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
6.7	Internal complaints handling		
6.7.1	Sydney Water must maintain a procedure for receiving, responding to and resolving Complaints. The procedure must be consistent with Australian Standard AS/NZS 10002:2014 – Guidelines for complaint management in organizations (the Internal Complaints Handling Procedure).	SC	
6.7.2	Sydney Water must ensure that the Internal Complaints Handling Procedure is fully implemented and that all relevant activities are carried out in accordance with the Internal Complaints Handling Procedure	SC	
6.7.3	Sydney Water must provide to Customers, at least annually with their Bills, information concerning internal Complaints handling. The information must explain how to make a Complaint and how Sydney Water will receive, respond to and resolve Complaints.	SC	
6.7.4	Sydney Water must make the information concerning internal Complaints handling referred to in clause 6.7.3 available to any person, free of charge: a) on its website; and b) upon request made to the Contact Centre.	Internal IPART check	This clause is not included in the auditor's scope.
6.8	External dispute resolution scheme		
6.8.1	Sydney Water must be a member of the Energy & Water Ombudsman NSW to facilitate the resolution of disputes between Sydney Water and its Customers and Consumers.	Internal IPART check	This clause is not included in the auditor's scope.
6.8.2	Sydney Water must: a) prepare a communication that: i. lists the dispute resolution services provided by the Energy & Water Ombudsman NSW, including any right to have a Complaint or dispute referred to the Energy & Water Ombudsman NSW; and ii. explains how a Consumer can contact the Energy & Water Ombudsman NSW; b) provide a copy of that communication, free of charge to Customers at least once a year with their Bills; and c) make a copy of that communication available to any person, free of charge: i. on its website; and ii. upon request made to the Contact Centre.	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
7.1	Memoranda of Understanding with WAMC, NSW Health and EPA		
7.1.1	Sydney Water must maintain the memoranda of understanding entered into under section 35 of the Act with: a) the Water Administration Ministerial Corporation (WAMC); b) the Secretary of the Ministry of Health (NSW Health); and c) the Environment Protection Authority (EPA).	SC	
7.1.2	The purpose of the memoranda of understanding referred to in clause 7.1.1 is to form the basis for cooperative relationships between the parties. In particular: a) the purpose of the memorandum of understanding with WAMC is to recognise the role of WAMC in regulating water access, use and management and Sydney Water's right to use water vested in WAMC; b) the purpose of the memorandum of understanding with NSW Health is to recognise the role of NSW Health in providing advice to the NSW Government in relation to Drinking Water quality standards and the supply of water which is safe to drink; and c) the purpose of the memorandum of understanding with EPA is to recognise the role of EPA as the environment regulator of New South Wales and to commit Sydney Water to environmental obligations.	NR	Information clause
7.2	Memorandum of Understanding with FRNSW		
7.2.1	Sydney Water must use its best endeavours to maintain a memorandum of understanding with Fire and Rescue NSW (FRNSW).	Internal IPART check	This clause is not included in the auditor's scope.
7.2.2	Sydney Water must use its best endeavours to comply with the memorandum of understanding with FRNSW.	Audit	FRNSW notes that Sydney Water has not provided sufficient resource commitment to provide a comprehensive data set detailing the performance of the entire Sydney Water network (as per cl 7.2.4 (b)(ii).
7.2.3	The purpose of the memorandum of understanding with FRNSW is to form the basis for cooperative relationships between the parties. In particular, the purpose is to: a) develop the roles and responsibilities of the parties as they relate to each other; b) identify the needs and constraints of the parties as they relate to each other; and c) identify and develop strategies for efficient and effective provision of firefighting water consistent with the goals of each party.	NR	Information clause

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
7.2.4	The memorandum of understanding with FRNSW must require the maintenance of a working group and must provide that: a) the working group must include representatives from Sydney Water and FRNSW and may include representatives from other organisations such as the NSW Rural Fire Service; and b) the working group is to consider the following matters (at a minimum): i. information sharing arrangements between Sydney Water and FRNSW; ii. agreed timelines and a format for Sydney Water to provide a report to FRNSW detailing the network performance with regard to availability of water for firefighting (taking into account the minimum available flow and pressure in localised areas of the network); iii. arrangements for Sydney Water to consult with FRNSW in the design of new assets and planning of system maintenance, where planning indicates that minimum available flow and pressure may unduly impact firefighting in the network section under consideration; and iv. other matters as agreed by both Sydney Water and FRNSW	Internal IPART check	This clause is not included in the auditor's scope.
8.1	Negotiations with WIC Act licensees and Potential Competitors		
8.1.1	Sydney Water must negotiate the provision of Services to WIC Act licensees and Potential Competitors in Good Faith.	SC	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
8.2	Publications of servicing information		
8.2.1	Sydney Water must, by the dates specified in this clause 8.2, publish electronically (in a form accessible from its website) at least ten years of servicing information for each major water system and wastewater system. The servicing information for each major water system and wastewater system must, at a minimum, include information on: a) current and projected demand; b) current and projected capacity constraints; c) indicative costs of alleviating or deferring capacity constraints; d) locations where further investigation is needed; and e) key sources of information used to develop the servicing information where those sources are publicly available, (the Servicing Information).	NR	Information clause (about the requirements related to the obligations in the remaining sub-clauses).
8.2.2	Sydney Water must, by 30 September 2020 (or another date approved by IPART in writing), publish electronically the Servicing Information for each major water system and wastewater system that it has available by that date that is in a form suitable for publication.	Internal IPART check	
8.2.3	Sydney Water must continue to publish Servicing Information for each major water system and wastewater system as it becomes available. Sydney Water must publish all Servicing Information by 30 June 2021 (or another date approved by IPART in writing).	Internal IPART check	
8.2.4	Sydney Water must publish updated Servicing Information for each major water system and wastewater system as soon as practicable after any such updated Servicing Information becomes available in a form suitable for publication.	SC	
8.2.5	Sydney Water must review and update the Servicing Information for each major water system and wastewater system at least once between: a) The date that is 12 months after the initial publication of the Servicing Information for that major water system or wastewater system under clause 8.2.2; and b) 30 June 2023 (or another date approved by IPART in writing).	NR	

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
8.2.6	Sydney Water is not required to comply with clauses 8.2.1 to 8.2.5 in relation to a particular major water system or wastewater system to the extent approved by IPART in writing. Sydney Water may apply to IPART for approval under this clause only where there are critical infrastructure security concerns in relation to a particular major water system or wastewater system.	NR	Information clause
8.3	Code of Conduct		
8.3.1	Sydney Water must use its best endeavours to cooperate with each WIC Act licensee to establish a code of conduct required by a WIC Act licence where Sydney Water has received a written request from the WIC Act licensee to establish such a code.	SC	
8.3.2	Where the Minister administering the WIC Act has established a code of conduct under clause 25 of the WIC Regulation, Sydney Water will be taken to have satisfied its obligation under clause 8.3.1 by applying the code of conduct to the relevant licensee under the WIC Act.	NR	
9.1	Cyber Security Management System		
9.1.1	From the Commencement Date (or another date approved by IPART in writing), Sydney Water must maintain a Management System for cyber security of Sydney Water's Assets (the Cyber Security Management System) that covers: a) information technology environments, hardware and systems; and b) operational technology environments, hardware and systems	NR	Audited separately by Cyber Security specialist auditor.
9.1.2	From the Commencement Date (or another date approved by IPART in writing), Sydney Water must ensure that the Cyber Security Management System is fully implemented and that all relevant activities are carried out in accordance with the Cyber Security Management System.	NR	Audited separately by Cyber Security specialist auditor.
9.2	Critical infrastructure Compliance manager		
9.2.1	Sydney Water must nominate, by notice in writing to IPART and the Commonwealth Representative, an executive level employee as Critical Infrastructure Compliance Manager. [Note: The reference to an executive level employee is a reference to a Level 3 employee or above under Sydney Water's structure at the Commencement Date.]	NR	Audited separately by Cyber Security specialist auditor.

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
9.2.2	Sydney Water's Critical Infrastructure Compliance Manager must be responsible for compliance with clause 9 of the Licence and Sydney Water's obligations under the *Security of Critical Infrastructure Act 2018* (Cth), and must act as the contact person for the Commonwealth Representative.	NR	Audited separately by Cyber Security specialist auditor.
9.3	National Security Clearances		
9.3.1	From 1 January 2020 (or another date approved by IPART in writing), Sydney Water must ensure that National Security Clearances are held by its Critical Infrastructure Compliance Manager, two board members and the executive level employees responsible for each of the following matters: a) operational technology security (including cyber security strategy, managing remote access to Assets and delivery of SCADA capability); b) network operations security (including operation, maintenance and physical security of Assets); and c) Personnel security operations (including security of Personnel and security risks posed by Personnel). [Note: The responsibilities at (a) to (c) above may be held by a single employee or shared between multiple employees. To ensure compliance with this clause when employees resign or are on leave, Sydney Water should ensure that National Security Clearances are held by alternates with relevant experience.]	NR	Audited separately by Cyber Security specialist auditor.
10.1	Operational Audits		
10.1.1	Sydney Water must cooperate with an audit undertaken by IPART or an Auditor of Sydney Water's compliance with any of the following: a) this Licence (including the Customer Contract); b) the Reporting Manual; and any matters specified by the Minister, (the Operational Audit).	Internal IPART check	This clause is not included in the auditor's scope.
10.1.2	For the purpose of any Operational Audit or verifying a report on an Operational Audit, Sydney Water must, within a reasonable period of receiving a request from IPART or an Auditor, provide IPART or the Auditor with all the information in Sydney Water's possession, custody or control that is necessary to conduct the Operational Audit, including any information that is reasonably requested by IPART or an Auditor.	Internal IPART check	This clause is not included in the auditor's scope.

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
10.1.3	For the purpose of any Operational Audit or verifying a report on an Operational Audit, Sydney Water must permit IPART or the Auditor to: a) access any works, premises or offices occupied by Sydney Water; b) carry out inspections, measurements and tests on, or in relation to, any such works, premises or offices; c) take on to any such premises or offices any person or equipment necessary for the purpose of performing the Operational Audit or verifying any report on the Operational Audit; d) inspect and make copies of, and take extracts from, any books and records of Sydney Water that are maintained in relation to the performance of Sydney Water's obligations under this Licence (including the Reporting Manual); and e) discuss matters relevant to the Operational Audit or any report on the Operational Audit with Sydney Water, including Sydney Water's officers and employees.	Internal IPART check	This clause is not included in the auditor's scope.
10.2	Reporting		
10.2.1	IPART has the function of determining Sydney Water's reporting and auditing obligations and publishing these obligations in a reporting manual (the Reporting Manual).	NR	
10.2.2	Sydney Water must comply with all of its reporting and auditing obligations set out in the Reporting Manual, including in relation to: a) water conservation and planning; b) performance standards for water quality; 10 Performance Monitoring and Reporting 26 Operating Licence 2019-2023 c) performance standards for service interruptions; d) Customers and Consumers; e) information and services for competitors; f) critical infrastructure security; and g) performance monitoring and reporting.	Audit	In the 2020 audit, we assigned Sydney Water a Non-Compliant (Non-Material) grade for this clause. Auditor should check the following Recommendations (see Table 3): - 2020 21 and - 2020 22 (d) Audited internally by IPART and not included in the auditor's scope. (f) To be audited separately by IPART and not included in the auditor's scope.

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
10.2.3	Sydney Water must: a) compile indicators of the direct impact on the environment of Sydney Water's activities (the Environment Performance Indicators). The Environment Performance Indicators must be consistent with the performance indicators specified in the Reporting Manual with an indicator number starting with 'E'; b) monitor and compile data on the Environment Performance Indicators, including data that allows a year to year comparison of the Environment Performance Indicators; and c) report on the Environment Performance Indicators in accordance with the Reporting Manual.	Audit	Audit the IPART environmental indicators.
10.2.4	Sydney Water must maintain sufficient record systems to enable Sydney Water to report accurately in accordance with this clause 10.2.	SC	
10.2.5	In the case of any disagreement between IPART and Sydney Water regarding the interpretation or application of any requirements of the Reporting Manual, IPART's interpretation or assessment of the application of the requirements will prevail.	NR	
10.3	Provision of information for performance monitoring		
10.3.1	Sydney Water must provide IPART information relating to the performance of any of Sydney Water's obligations under clause 10.2 (including providing IPART physical and electronic access to the records required to be kept under clause 10.2) within a reasonable time of Sydney Water's receiving a request from IPART for that information.	Internal IPART check	This clause is not included in the auditor's scope.
10.3.2	Sydney Water must provide IPART such information as is reasonably required to enable IPART to conduct any review or investigation of Sydney Water's obligations under this Licence within a reasonable time of Sydney Water receiving a request from IPART for that information.	Internal IPART check	This clause is not included in the auditor's scope.
10.3.3	If Sydney Water engages any person (including a subsidiary) to undertake any activities on its behalf, it must take all reasonable steps to ensure that, if required by IPART or an Auditor, any such persons provide information and do the things specified in clause 10.1 as if that person were Sydney Water.	Internal IPART check	This clause is not included in the auditor's scope.
10.3.4	If IPART or an Auditor requests information that is confidential, the information must be provided to IPART or the Auditor, subject to IPART or the Auditor entering into reasonable arrangements to ensure that the information remains confidential.	Internal IPART check	This clause is not included in the auditor's scope.

Licence clause	Operating Licence obligation	2021 audit requirement	Comments for the auditor
10.3.5	Sydney Water must provide NSW Health with information relating to water quality in the manner and form specified by NSW Health within a reasonable time of receiving NSW Health's request. [Note: Under section 19 of the Public Health Act 2010 (NSW), the Secretary of NSW Health may require Sydney Water to produce certain information.]	Internal IPART check	This clause is not included in the auditor's scope.

Source: Sydney Water Corporation five year audit program.

Table 3 Recommendations / outstanding items from previous audits

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2019-01	Water Quality (Drinking water) clause 2.1.1	By 30 June 2020, establish a documented procedure for evaluating the chlorine solution used in the networks maintenance activities and for evaluating the associated supplier(s).	This recommendation remains open and should be checked for completion at the next operational audit.	Auditor to check for completion.
2020-01	Licence and licence authorisations (Pricing) clause 1.7.1	By 28 February 2021 (in advance of the updating of charges for the next financial year), Sydney Water must review its operating procedures to ensure that they reflect the requirements relating to any uplift charges for the Sydney Desalination Plant (noting that the 1 July 2020 Determination[1] has different mechanisms for the uplift charge) and update these procedures as required. Sydney Water should also raise awareness around uplift charging requirements for relevant staff, where appropriate.	**Completed** Sydney Water reviewed and updated its drought uplift water usage charge procedure to ensure that it reflects the requirements relating to any uplift charges for the Sydney Desalination Plant. A brief training session is planned for relevant members of the Billing team to ensure awareness of the uplift charging requirements.	Auditor to check for completion.

1 IPART, *Prices for Sydney Desalination Plant Pty Ltd's Water Supply Services*, 1 July 2017 to 30 June 2022.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-02	Economic approach for water conservation (water conservation program) clause 3.1.1	Sydney Water must update the Water Conservation Report to include more information on the development, delivery and monitoring of the program. This should include more information on how projects are first identified from the wide range of potential options, assessment of project effectiveness and monitoring of benefits. Sydney Water must develop the structure of this report and content to be included in time for the next water conservation report for the 2020-21 year.	**On track** The structure of the 2021 Water Conservation Report has been developed and reviewed by the Internal Audit team (as part of an internal audit) to ensure that it meets these requirements. Due dates (as proposed by Sydney Water) 31 March 2021 – Water Conservation Report structure 1 September 2021 – Submission of Water Conservation Report for 2021 (Part of Annual Statement of Compliance report)	Auditor to check for completion.
2020-03	Economic approach for water conservation (water conservation program) clause 3.1.1	By 30 June 2021, Sydney Water must demonstrate measures that have been taken in the 2020-21 financial year to improve its systems and processes used to deliver the water conservation program, including program monitoring and corrective action processes.	**On track** Clear documentation has been developed to support delivery of the Water Conservation Program, including: • water conservation Project Control Board minutes, • 2020 water conservation program review report, • Executive and Board papers and decision making processes.	Auditor to check for completion.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-04	Economic approach for water conservation (implement measures) clause 3.1.2	Sydney Water must identify, assess, and include where appropriate measures for reducing leakage to below the economic level within its water conservation program. This should be completed for inclusion in the 2021-22 water conservation program.	**On track** Funding has been allocated to leak detection initiatives from the water conservation budget. In February 2021, the Executive approved continued funding of active leak detection above the historical rate (pre 2019-20) despite increased dam levels, to enable protection of water supply water to meet increased customer demands due to growth. The increased active leak detection is part of a program of work developed to bring leakage to within the ELL, which will be implemented as part of the Water Leakage Plan.	Auditor to check for completion.
2020-05	Drinking water Clause 4.1.1	By 31 March 2021, Sydney Water must document the scope of the drinking water annual operational risk assessment reviews, and ensure a NSW Health representative is present during assessment of public health risks.	Completed Discussed and agreed in principle with NSW Health. Comments from NSW Health were incorporated into the IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water. The SOP includes: • detailed scope of the drinking water annual operational risk assessment reviews, including the requirement to invite NSW Health to the annual reviews • triggers for detailed risk assessment for focus areas in drinking water • scope of detailed risk assessment for focus areas in drinking water	Auditor to check for completion.
2020-06:	Drinking water Clause 4.1.1	By 30 June 2021, Sydney Water must review the Corporate Risk Matrix to rectify inconsistencies between Public Health and Injury /Illness consequence descriptors, including liaison with NSW Health.	**On track** Public health consequence descriptors are being reviewed to update examples of historical water quality incidents and remove references to the number of illnesses/fatalities. Examples have been updated to focus on the number of people exposed to unsafe water. Examples for public health and illness/injury are being re-aligned. The Risk and Water Quality teams will produce a slide package to explain how the categories are applied to guide the implementation in risk assessments.	Auditor to check for completion.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-07:	Drinking water Clause 4.1.1	By 31 March 2021, Sydney Water must formalise the process for how the updated risk matrix and risk procedure is being implemented across water supply systems, including resolving inconsistencies in superseded documentation references, particularly noting the IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water procedure.	**Completed** The drinking water facility-based operational risk assessment workshops held in 2019 used the Corporate Risk Matrix of that time. For consistency and continuity, the same risk matrix was used for the 2020 annual risk reviews and will be used for 2021 risk review, as the complete risk assessment is only completed on a 3-yearly basis. The current Corporate Risk matrix will be used for the 2022 Operational Risk Assessments. The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water has been updated with current documentation references.	Auditor to check for completion.
2020-08:	Drinking water Clause 4.1.3	By 30 June 2021, Sydney Water must establish processes for identifying and actioning improvement items identified in risk assessments to ensure timely resolution. After Sydney Water has established these processes, update the Product Management Improvement Framework.	**On track** The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water includes criteria used as a guiding principle for decision making regarding actions to be included in the improvement plan and the prioritisation of those actions. The Product Quality Improvement Framework is being updated by the Water Quality team to address this action and incorporate additional feedback in relation to recycled water.	Auditor to check for completion.
2020-09:	Recycled water Clause 4.2.1	By 30 June 2021, Sydney Water must document the procedure for undertaking annual recycled water operational risk assessment reviews.	**On track** A review of recycled water performance will be added to the annual operational performance review process and the procedure updated.	Auditor to check for completion.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-10:	Recycled water Clause 4.2.1	By 31 March 2021, Sydney Water must ensure risk assessment documentation (including workshop reports and the operational risk assessment procedure) refer to the current Risk Management Procedure and Risk Matrix.	**Completed** The risk workshop procedure has been updated to refer to the correct risk matrix and procedure	Auditor to check for completion.
2020-11:	Recycled water Clause 4.2.1	By 30 September 2021, Sydney Water must update critical control point documentation for the audited WRP to document the basis for the CCT low flow critical control point.	**On track** The West Camden Recycled Water Quality Management Plan (RWQMP) is currently being reviewed and the Chlorine Contact Tank (CCT) low flow setpoint will be reviewed as part of this process.	Auditor to check progress.
2020-12:	Recycled water Clause 4.2.1	By 31 December 2021, Sydney Water must update scheme specific referencing in recycled water quality management plans that are scheduled for review in the next audit period to include reference to scheme specific documentation, including the audited Recycled Water Quality Management Plan. Include an action in the Recycled Water Improvement Register to update all scheme specific plans with this information at their scheduled review.	**On track** The structure of information in the Recycled Water Manual and individual RWQMPs is being reviewed to remove duplication and to focus individual scheme specific plans on scheme specific documentation. This process will be added to the Recycled Water Improvement Register and updates will progress as part of the four-yearly review cycle. A review of the West Camden RWQMP is in progress.	Auditor to check progress.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-13:	Recycled water Clause 4.2.1	By 31 December 2021, Sydney Water must update the recycled water audit schedule to ensure an annual review of high risk AGWR elements at a number of recycled water schemes each year (as agreed with NSW Health). The schedule should be risk-based and consider locations and exposures. All recycled water schemes should be audited within a 3-year cycle.	**On track** • Criteria for prioritising recycled water schemes based on risk have been developed • All recycled water schemes have been ranked based on the prioritisation criteria and an audit schedule has been developed • The proposed audit schedule will be presented at the Joint Operational Group (JOG) in May 2021 to engage with NSW Health and seek their agreement to the risk based schedule • A quotation from an external SME has been sought to conduct the audits. This will provide an independent assessment • Audits are scheduled to commence in Quarter 1 of 2021-22 (1-2 schemes/quarter).	Auditor to check progress.
2020-14:	Recycled water Clause 4.2.1	By 30 June 2021, Sydney Water must review and update the Product Management Improvement Framework to explicitly reference recycled water. Establish processes for identifying and actioning action items in risk assessment to ensure timely resolution and update the Product Management Improvement Framework.	**On track** The Product Management Improvement Framework is currently being reviewed to address the areas specified in the recommendation.	Auditor to check for completion.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-15:	Recycled water Clause 4.2.3	By 30 June 2021, Sydney Water must review permissions and limits in SCADA to ensure that changes outside critical limits can only be made in accordance with an appropriate change management procedure and that critical limits align with the critical control point documentation for all plants.	**On track** A business case and scope of work (covering both aspects of the recommendation) has been developed, including implementation by Digital - Operational Technology Programs to physically prevent critical limits being changed outside Critical Control Points (CCPs). Interim administrative procedure and training to be undertaken.	Auditor to check for completion.
2020-16:	Recycled water Clause 4.2.3	By 30 June 2021, Sydney water must formalise the review of the recycled water verification report, to be explicit about the need to manually check that exceptions are included in the Irrigation Scheme Monthly reports, and train staff in the updates.	**Completed** The procedure has been updated and training completed.	Auditor to check for completion.
2020-17:	Water Continuity Standard Clause 5.1.1	By 30 June 2021, Sydney Water must provide updated analysis of its understanding of the relationship between prevailing weather conditions in the last five years, soil moisture and the impact on water main bursts, leaks and unplanned supply interruptions.	**On track** Previous studies have been collated to determine new work scopes for investigation concerning the impacts of weather changes and soil moisture on the Sydney Water network. A paper summarising the findings is being prepared and will provide input into relevant programs including the Leakage Management Program.	Auditor to check for completion.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-18:	Water Continuity Standard Clause 5.1.1	By 31 December 2021, Sydney Water must complete lessons learned reports for the five largest unplanned water supply interruption events that occurred in 2019-20 and identify what measures could be implemented in future to reduce the number of properties impacted by future interruptions at these locations. Sydney Water should demonstrate how it has considered the application of these lessons learned across its entire network.	**On track** A team was assembled in February 2021 to conduct the investigations. A pre-investigation information template was circulated to gather factual information about the incidents in preparation for the face to face workshops. Half-day workshops have been scheduled over May to early June 2021 to conduct the investigations. Root cause analysis will be undertaken to help identify measures to mitigate the incidence or impact of future interruptions and common findings/ lessons learned that can be applied to the broader network.	Auditor to check progress.
2020-19:	Water pressure standard Clause 5.2.5	By 31 March 2021, Sydney Water must update its business process manual to fully and accurately include low pressure clusters.	**Completed** The business process manual has been updated to fully and accurately reflect low pressure clusters.	Auditor to check for completion.
2020-20:	Asset management Clause 5.5.2	By 31 December 2021, Sydney Water must review its inspection programs for all asset classes to incorporate lessons learned from its current inspection program for sewage pumping stations. The output should be an updated condition assessment strategy (or similar) document(s) that specifies the desired approach to condition assessment for all major asset classes including (but not limited to):	**On track** A proposal for the review is currently being assessed. A new position has been created and recruitment is in the final stages. One of the responsibilities of this role is to assure the condition assessment of structural assets. In addition, we are proposing to engage a new Service Planning Analyst to monitor and coordinate all asset class condition monitoring programs.	Auditor to check progress.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
		- consideration of risk of asset failure and consequence of failure - frequency of inspection - level of inspection (visual v detailed inspection) and situations where more detailed inspections are warranted - inspection techniques resourcing and support considerations such as access and shutdowns.		
2020-21:	Reporting Clause 10.2.2	By 31 March 2021, Sydney Water must ensure that all information required for annual compliance reporting is provided, including: critical control breaches for all plants, whether automated or manually monitored; assessment of the performance of critical control points over the long term; and the proposed water quality management activities and programs, including expected outcomes, scope and timetable for completion.	**Completed** Compliance reports for drinking water and recycled water will be reviewed and updated for 2020-21 and include the items recommended by the auditor.	Auditor to check for completion.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
2020-22:	Reporting Clause 10.2.2	Sydney Water must include detailed and quantitative discussion regarding the drivers for observed performance and variances to historical performance for all Performance Standards in the Performance Standards Report. This should be implemented for the next Performance Standards Report which will be for the 2020/21 year. Under Sydney Water's Reporting Manual, the Performance Standards Report is due for submission by 1 September following the end of the relevant financial year (i.e., 1 September 2021).	**On track** A component on this work is linked to Recommendations 2020-17 and 2020-18, which are currently in progress. Investigations for recent main breaks (water and wastewater) that have occurred throughout March and April 2021, will also be assessed as completed and any findings linked to the performance standards will be included in our 2020-21 Performance Standards Reports.	Auditor to check for completion.
2020-23:	Reporting Clause 10.2.4	By 30 June 2021, Sydney Water must improve document control of the records held in its systems by ensuring that information such as the version date, version number, change history and document author are included in all records.	On track The following actions are completed or underway: • Coaching & mentoring key control document contributors through business partnering. • Delivered several Controlled Document training sessions covering good document management practices and how to comply with the Controlled Document Standard. • Posted weekly updates on Yammer (internal social media site) promoting best practice document control and newly introduced features in SWIM (document system). • Created templates for the majority of controlled document types to ensure consistency and standardisation of metadata.	Auditor to check for completion.

Recommendation number	Operational issue (licence reference where applicable)	IPART's recommendation to the Minister	Audit findings (Status will be reported by Sydney Water in audit recommendations update on 31 May 2021[a])	Guidance for 2021 audit
			• Nominated suitable document controllers in SWIM to ensure standards are consistent across document management platforms. • Established a reporting capability to improve monitoring of compliance with the controlled document standard across the enterprise and identify areas that require additional support.	

a Sydney Water is required to provide a report on progress by 31 March 2021 or a later date agreed by IPART. Due to the timing of the audit, the Tribunal has agreed to a later date of 31 May 2021 for Sydney Water to report on its progress with the audit recommendations

Source: IPART, *Report to the Minister - Sydney Water Corporation Operational audit 2019-20, March 2021*

Table 4 Field verification locations for Sydney Water Corporation

Audit year	Location	Facility
2020	Nepean	Water Filtration Plant
	West Camden	Water Recycling Plant
	Prospect	Water and sewer pump stations - maintenance
	Camellia	Sewer pump station - maintenance
2019	Oak Flats	Re-chlorination Plant
	Wollongong	Water Recycling Plant
	Helensburgh	Reservoir
	Woronora	Water Filtration Plant
2018	Cascade	Water Filtration Plant
	Parklea	Drinking and Recycled Water Reservoirs, and rechlorination station
	Rouse Hill	Water Recycling Plant and network
2017	Nepean	Water Filtration Plant
	Prospect	Water Filtration Plant
	Campbelltown	Reservoir
	Liverpool	Water Recycling Plant
	Guildford	Water main renewal - maintenance
2016	Orchard Hill	Water Filtration Plant
	Preston	Maintenance Depot
	Cronulla	Wastewater Treatment Plant
2015	Parklea	Reservoir
	Box Hill	Pumping Station
	North Richmond	Water Filtration Plant
	Rouse Hill	Water Recycling Plant
2014	West Camden	Water Recycling Plant
	Warragamba	Water Filtration Plant
		South West Growth Area
2013	Macarthur	Water Filtration Plant
	Liverpool	Customer Service Centre
	Liverpool	Water Recycling Plant
	West Hoxton	Priority Sewage Project
2012	Wollongong	Water Recycling Plant
	Woronora	Water Filtration Plant

Audit year	Location	Facility
	Heathcote	Reservoir
2011	N/A	Three treated water reservoirs
	Orchard Hills	Water Filtration Plant
	Drummoyne	Mains flushing

D Auditor's report

Sydney Water

2021 OPERATIONAL AUDIT

IPART

January 2022

Version 3.0

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Executive Summary

Auditor's declaration

This report presents the findings of the audit of Sydney Water operations against the Sydney Water Operating Licence 2019-2023 and the Sydney Water Act 1994 (NSW), consistent with audit requirements set out in IPART's Audit Guideline Public Water Utilities (July 2019) for the period 1 July 2020 to 30 June 2021.

The auditors confirm that:

- We have seen sufficient evidence on which to base our conclusions.
- Our audit findings accurately reflect the professional opinions of the auditors.
- We have conducted the audit, determined audit findings and prepared the report consistent with audit requirements set out in IPART's Audit Guideline Public Water Utilities (July 2019) and IPART's Request for Quote.
- Our audit findings have not been unduly influenced by the utility and/or any of its associates.

Major findings

A summary of major audit findings for the 2020-21 audit period is shown in Table i-i.

Table i-i. Summary of audit findings against audited licence obligations

Section	Clause	Sub clause	Audit grade
1 Licence Context	1.7 – Pricing	1.7.1	Compliant
2 Licence Authorisation	2.2 – Obligation to make services available	2.2.1	Compliant
		2.2.2	Compliant
3 Water Conservation and Planning	3.1 – Economic approach for water conservation	3.1.1	Compliant
		3.1.2	Compliant
	3.2 – Water Planning	3.2.4	Compliant
4 Performance Standards for Water Quality	4.1 – Drinking water	4.1.1	Compliant (minor shortcomings)
		4.1.3	Non-compliant (non-material)
	4.2 – Recycled water	4.2.1	Compliant (minor shortcomings)
		4.2.3	Compliant (minor shortcomings)
	4.3 - Fluoridation	4.3.1	Compliant
5 Performance Standards for Service Interruptions	5.1 – Water Continuity Standard	5.1.1	Compliant
		5.1.4	Compliant
	5.3 – Dry Weather Wastewater Overflow Standard	5.3.1	Compliant
	5.5 – Asset Management	5.5.2	Non-compliant (material)

Section	Clause	Sub clause	Audit grade
7 Stakeholder Cooperation	7.2 – Memorandum of understanding with FRNSW	7.2.2	Compliant
10 Performance Monitoring and Reporting	10.2 – Reporting	10.2.2	Non-compliant (non-material)
		10.2.3	Non-compliant (non-material)

Recommendations

Recommendations arising from the Sydney Water 2020 Operational Audit and a summary of the risks of non-compliance are shown in Table i-ii, Table i-iii and Table i-iv.

Table i-ii. Recommendations for Clause 4 Performance Standards for Water Quality

Sub clause	Risk of non-compliance	Recommendations
4.1.1	Without clear, concise and accurate operating procedures and effective measure to prevent, control and mitigate incidents and emergencies, a material risk is posed to public health.	Recommendation 4.1.1-1: We recommend that by 30 June 2022 Sydney Water establish processes, accountabilities and schedules for the review of the DWQMP including: • descriptive text in Helix • accurate links within Helix • updating of the Drinking Water Management Manual. The review frequency should reflect the frequency with which each aspect changes. Processes to ensure the reviews are conducted must be established. Sydney Water must prioritise the review aspects noted in this audit report including Element 8 and the documentation of how Sydney Water meets its obligations to prepare an annual report to customers and stakeholders (element 10) so the DWQMP accurately reflects Sydney Water's practices. We recommend that by 30 June 2023 Sydney Water ensure that the water quality management system and supporting procedures are current and do not rely solely on the specified review period but also consider non time based triggers. Recommendation 4.1.1-2: We recommend that by 30 June 2022 the Macarthur Drinking Water Quality Management Plan is updated to address all the relevant actions in the Framework for drinking water quality management. There is also further opportunity for improvement to document the ADWG actions that are only addressed by Sydney Water's DWQMS.
4.1.3	There is a material risk to public health if water quality risks are not identified and appropriately managed. In the audit period drinking water quality was not impacted by the identified non-compliance and was thus graded as non-material.	Recommendation 4.1.3-1: We recommend that by 30 June 2022 Sydney Water review process to ensure NSW Health is invited to all risk assessments which consider public health risks (across all relevant risk assessments, including. operational, incident management, projects) Recommendation 4.1.3-2: We recommend by 30 June 2023 Sydney Water completes its current improvement project on incident investigations and its current review cycle of preventative aspects of the Incident Management and Emergency Management Procedures, such as business

Sub clause	Risk of non-compliance	Recommendations
		impact assessments and continuity plans and have evidence of implementation of the project outcomes. Recommendation 4.1.3-3: We recommended by 30 June 2022 Sydney Water has evidence to demonstrate that the operational risk assessment workshop procedure (D0000799) has been fully implemented for both the WFP and networks. This includes the identification of all recycle streams in the PFD as per D0000685. Recommendation 4.1.3-4: We recommend that by 30 June 2022 Sydney Water undertake a formal risk assessment on the residual lagoon at Macarthur WFP to identify circumstances where chemical spills and other contaminants may enter the lagoon and be returned to the head of the works and ensure processes and procedures for monitoring and managing these risks are adequate and implemented. This risk assessment may be undertaken as part of the annual risk review. Recommendation 4.1.3-5: We recommend that by 30 June 2022 Sydney Water review the instrument calibration and checks for the Hach Pocket Colorimeter to ensure the requirements are clarified, documented and implemented.
4.2.1	Conflicts in sampling documentation create compliance risk that sampling requirements are not met. If management review and auditing processes do not specifically consider recycled water quality obligations there is a gap that may manifest as a public health or environmental impact.	Recommendation 4.2.1-1: We recommend by 30 June 2022, Sydney Water resolve or remove the discrepancies between the monitoring plans in the Liverpool RWQMP and the annual Recycled Water Monitoring Plan. Recommendation 4.2.1-2: We recommend by 31 December 2022, Sydney Water update Work Instruction for Creation of Process Flow Diagrams (D0000685) to include specific instructions and examples for recycled water. Update all recycled water flow diagrams to be consistent with the updated work instruction. Update the Liverpool RWQMP to only include one flow diagram. Recommendation 4.2.1-3: We recommend by 30 June 2022, Sydney Water incorporate management review requirements for recycled water and drinking water management systems into the Management Review Procedure. Recommendation 4.2.1-4: We recommend by 30 June 2022, Sydney Water incorporate audit requirements for recycled water and drinking water management systems into the 2LOA Audit Procedure.
4.2.3	There is a compliance risk that Sydney Water does not meets is sampling obligations	Recommendation 4.2.3-1: We recommend by 31 March 2022, Sydney Water update Irrigation Scheme Monthly Reports to include explanations when fewer samples are required in the period than the frequency in the monitoring plan (e.g. if there are four weeks in the month why are less than four weekly samples required).

Table i-iii. Recommendations for clause 5 Performance Standards for Service Interruptions

Sub clause	Risk of non-compliance	Recommendations
5.5.2	If assets are poorly managed, higher costs and failure to meet required service levels including public health and environmental protection will result.	Recommendation 5.5.2-1: We recommend that by 30 June 2022 Sydney Water reviews its project development and assurance approach (i.e. business case and gateway process and documents) to determine whether the mitigation measures identified in project risks assessments are recorded and their implementation tracked. Recommendation 5.5.2-2: We recommend that by 30 June 2022 Sydney Water reviews any public health related project risks to determine whether the management of these risks is in accordance with its risk management framework.

Table i-iv. Recommendations for clause 10 Performance Monitoring and Reporting

Sub clause	Risk of non-compliance	Recommendations
10.2.2	There is a compliance risk when reporting does not meet all the requirements	10.2.2-1: We recommend by 30 June 2022 Sydney Water, ensures the Quarterly – Water Quality Monitoring Report – Drinking Water (the public water quality reports meets the requirements of the Reporting Manual to report each quarter on their performance against all health and aesthetic water characteristics and raw water operational characteristics identified in the Drinking Water Quality Management System. Recommendation 2020-22 also applies to this clause.
10.2.3	There is a compliance risk when reporting if data is not accurate.	Recommendation 10.2.3-1: By 30 June 2022, we recommend that Sydney Water conducts an internal audit of its reported environmental data to provide assurance that the data is accurate and in accordance with the reporting definitions.

Contents

Tables

Figures

Glossary

Item	Detail
1MS	One Management System
2LOA	Second Line of Assurance
ADWG	NHMRC, NRMMC (2011) Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council, National Resource Management Ministerial Council, Commonwealth of Australia, Canberra. ISBN Online: 1864965118
AGWR	AGWR, 2006, Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1). Natural Resource Management Ministerial Council Environment Protection and Heritage Council Australian Health Ministers Conference. Web Copy: ISBN 1 921173 06 8
AMCV	Asset Management Customer Value
AMS	Asset Management System
AS	Australian Standard
AS 4747:2013	Australian Standard, Meters for non-urban water supply – In-service compliance for non-urban water meters
AS ISO 19600:2015	Compliance management systems – Guidelines
AS/NZS ISO 9001:2016	Quality Management Systems – Requirements (the Quality Management System)
AS/NZS 4020:2018	Australian and New Zealand Standards for testing of products for use in contact with drinking water
ASAE 3100	Standard on Assurance Engagements ASAE 3100 Compliance Engagements
Audit Guideline	IPART Public Water Utility Audit Guideline (July 2019)
Audit Period	The dates of 1 July 2020 to 30 June 2021 over which Sydney Water compliance is checked against certain clauses of its Operating Licence (as determined by IPART)
BMIS	Business Management Information System
BOO	Build Own Operate
C2C	Catchment to Consumer
CAG	Customer Advisory Group
CALD	Culturally and Linguistically Diverse
CAR	Compliance Accountability Register
CCP	Critical control point
Component	Either refers to the Element components of the ADWG or AGWR Framework or Sydney Water WQMS component depending upon the context
CRM	Customer Relationship Management
Ct	Chlorine contact time multiplied by chlorine concentration
DAF	Dissolved Air Flotation

Item	Detail
DPIE	NSW Department of Planning, Industry and Environment
DW	Drinking Water
DWMS	Drinking Water Management System (referenced in Sydney Water procedures and text)
DWQMS	Drinking Water Quality Management System (the term in the licence requirement)
Element	Elements of the ADWG Framework for the Management of Drinking or Recycled Water Quality
EMS	Environment management system
Framework	Framework for Management of Drinking or Recycled Water Quality
FRNSW	Fire and Rescue New South Wales
GIS	Geographic Information System
Helix	A Business Model Repository (online platform) which allows filtering to show the entire DWQMS for a specific supply system
ICT	Information and communications technology
IICATS	System used to identify probable unplanned water interruptions by using alarms of reservoir depletion, pump faults or pressure drops
IPART	Independent Pricing and Regulatory Tribunal of NSW
ISO	International Standards Organisation
ISO 14001:2015	Environmental management systems – Requirements with guidance for use
ISO 17021:2015	Conformity Assessment
ISO 19011:2018	Guidelines for auditing management systems
ISO 3100:2108	Risk Management
ISO 55000:2014	Asset management – Overview, principles and terminology
ISO 55001:2014	Asset management – Management systems – Requirements
JOG	Joint Operations Group
KOIOS	Software for reviewing long-term data trends in lab and SCADA data
KPI	Key performance indicator
Licence	Sydney Water Operating Licence 2019-2023
LOS	Levels of Service
LIMNOS	Actions database
LTV	Long-Term Value
MoU	Memorandum of Understanding
MSC	Meter service charging
NATA	National Association of Testing Authorities
NDMA	n-nitrosodimethylamine
NRAR	Natural Resource Access Regulator
NSW	New South Wales
NSW Health	NSW Ministry of Health
PAC	Powdered Activated Carbon
PM	Preventative Maintenance
PSAT	Pollution Source Assessment Tool

Item	Detail
QAP	Quality assurance plan
R&D	Research and development
R&I	Research and innovation
RACI	Responsibilities, Accountabilities, Consult and Inform
Reporting Manual	Sydney Water Reporting Manual Operating Licence 2019-2023 (IPART November 2019)
RW	Recycled Water
RWMM	Recycled Water Management Manual
RWMS	Recycled Water Management System
RWQMP	Recycled Water Quality Management Plan
SAP	Sydney Water corporate wide system for maintenance management
SCADA	System Control and Data Acquisition
SDP	Sydney Desalination Plant
SLG	Strategic Liaison Group
SOP	Standard operating procedure
SWC	Sydney Water (Corporation)
SWIM	Sydney Water Information Management
SWIRL	Sydney Water Incident Recording and Learning System
SWMS	Safe Work Method Statement
Sydney Water Tap in™	Sydney Water customer connection online application portal
WAMC	Water Administration Ministerial Council
WAS	Water Accounting System
WFP	Water Filtration Plant
WQ	Water Quality
WQMS	Water Quality Management System
WRAP	Water Reform Action Plan
WRP	Water Recycling Plant
WRR	Water Resource Recovery
WS&P	Water Supply and Production
WSAA	Water Services Association of Australia

1 Introduction

1.1 Objectives

The objective of this engagement was to conduct an audit of Sydney Water performance against the terms and conditions (as defined in the audit scope) of its operating licence and any other Ministerially-imposed requirements for the period from 1 July 2020 to 30 June 2021, including:

- Sydney Water Operating Licence 2019-2023
- Sydney Water Reporting Manual – Operating Licence 2019-2023
- IPART's Audit Guideline Public Water Utilities (July 2019)
- IPART's Sydney Water Operational Audit 2020 - Report to the Minister.

The Atom Consulting team also audited existing recommendations outstanding from previous audits and expressed an opinion on progress to meeting or closing-out these recommendations.

1.2 Audit method

Audit scope

The scope of the audit was:

- The operational licence clauses listed in Table 1-1. These clauses have been selected by IPART on a risk basis.
- Recommendation 2019-01: Water Quality (Drinking water) clause 2.1.1
- Recommendation 2020-01: Licence and licence authorisations (Pricing) clause 1.7.1
- Recommendation 2020-02: Economic approach for water conservation (water conservation program) clause 3.1.1
- Recommendation 2020-03: Economic approach for water conservation (water conservation program) clause 3.1.1
- Recommendation 2020-04: Economic approach for water conservation (implement measures) clause 3.1.2
- Recommendation 2020-05: Drinking water clause 4.1.1
- Recommendation 2020-06: Drinking water clause 4.1.1
- Recommendation 2020-07: Drinking water clause 4.1.1
- Recommendation 2020-08: Drinking water clause 4.1.3
- Recommendation 2020-09: Recycled water clause 4.2.1
- Recommendation 2020-10: Recycled water clause 4.2.1
- Recommendation 2020-11: Recycled water clause 4.2.1
- Recommendation 2020-12: Recycled water clause 4.2.1
- Recommendation 2020-13: Recycled water clause 4.2.1
- Recommendation 2020-14: Recycled water clause 4.2.1
- Recommendation 2020-15: Recycled water clause 4.2.3
- Recommendation 2020-16: Recycled water clause 4.2.3
- Recommendation 2020-17: Water continuity standard clause 5.1.1

- Recommendation 2020-18: Water continuity standard clause 5.1.1
- Recommendation 2020-19: Water pressure standard clause 5.2.5
- Recommendation 2020-20: Asset management clause 5.5.2
- Recommendation 2020-21: Reporting clause 10.2.2
- Recommendation 2020-22: Reporting clause 10.2.2
- Recommendation 2020-23: Reporting clause 10.2.4.

The audit covers the period from 1 July 2020 to 30 June 2021.

Table 1-1. Licence sections within the 2020-21 audit scope

Section	Clause	Sub clauses
1 Licence Context	1.7 – Pricing	1.7.1
2 Licence Authorisation	2.2 – Obligation to make services available	2.2.1
		2.2.2
3 Water Conservation and Planning	3.1 – Economic approach for water conservation	3.1.1
		3.1.2
	3.2 – Water Planning	3.2.4
4 Performance Standards for Water Quality	4.1 – Drinking water	4.1.1
		4.1.3
	4.2 – Recycled water	4.2.1
		4.2.3
	4.3 - Fluoridation	4.3.1
5 Performance Standards for Service Interruptions	5.1 – Water Continuity Standard	5.1.1
		5.1.4
	5.3 – Dry Weather Wastewater Overflow Standard	5.3.1
	5.5 – Asset Management	5.5.2
7 Stakeholder Cooperation	7.2 – Memorandum of understanding with FRNSW	7.2.2
10 Performance Monitoring and Reporting	10.2 – Reporting	10.2.2
		10.2.3

Audit standard

In conducting the audit, the auditors are following IPART's Audit Guideline Public Water Utilities (July 2019).

Regard was also given to the following standards and codes, especially where these provided specific detail that is appropriate to the audit:

- ASAE 3100 (2017) Compliance Engagements issued by the Auditing and Assurance Standards Board
- ISO 19011:2018 Guidelines for auditing management systems
- AS/NZS ISO 9001:2016: Quality management systems – Requirements
- ISO 17021:2015 Conformity Assessment – Requirements for bodies providing audit and certification of management systems (contains principles and requirements for

the competence, consistency and impartiality of the audit and certification of management systems of all types)
- ISO 3100:2108 Risk management.

Audit steps

The audit process was conducted as described in IPART's Audit Guideline Public Water Utilities (July 2019).

Audit team

The audit team and audit qualifications are provided in Table 1-2.

Table 1-2. Audit team members and their qualifications

Team Member	Details
Dr Annalisa Contos Atom Consulting	Dr Annalisa Contos holds the following auditor qualifications: A registered Exemplar Global lead auditor (Certificate No. 113465): • Exemplar Global -DW (Drinking Water) • Exemplar Global -RW (Recycled Water) • Exemplar Global TL-AU (Lead Auditor) NSW IPART (Independent Pricing and Regulatory Tribunal) qualified: • Lead Auditor Licence and Regulatory Compliance • Lead Auditor and Area Specialist Infrastructure Performance • Lead Auditor and Area Specialist Drinking Water Quality • Lead Auditor and Area Specialist Recycled Water Quality • Lead Auditor and Area Specialist Sewage Management • Area Specialist Environmental Management
Stephen Walker Cardno	Stephen Walker holds the following auditor qualifications: World Partners in Asset Management Certified Asset Management Assessor No. 59 (www.wpiam.com). This accreditation demonstrates compliance with ISO 17021-5 Competence requirements for auditing and certification of asset management system. A registered Exemplar Global lead auditor (Certificate No. 638040): • Exemplar Global TL-AU (Lead Auditor) • Exemplar Global -DW (Drinking Water) NSW IPART (Independent Pricing and Regulatory Tribunal): • Lead Auditor and Area Specialist Infrastructure Performance • Lead Auditor Licence and Regulatory Compliance • Lead Auditor and Area Specialist Sewage Management • Lead Auditor and Area Specialist Retail Supply

Team Member	Details
David Bartley Atom Consulting	David Bartley holds the following auditor qualifications: A registered Exemplar Global lead auditor (Certificate No. 206802): • Exemplar Global -DW (Drinking Water) • Exemplar Global -RW (Recycled Water) • Exemplar Global TL-AU (Lead Auditor) NSW IPART (Independent Pricing and Regulatory Tribunal): • Lead Auditor/Auditor Licence and Regulatory Compliance • Lead Auditor/Auditor Infrastructure Performance • Lead Auditor/Auditor Drinking Water Quality • Lead Auditor/Auditor Recycled Water Quality • Lead Auditor/Auditor Sewage Management and Land Disposal David Bartley holds the following fluoride qualification: • Fluoride plant operator's certificate (NSW Health)
Steven Contos Atom Consulting	Steven Contos holds the following auditor qualifications • Exemplar Global -DW (Drinking Water) • Exemplar Global -RW (Recycled Water) • Exemplar Global -AU (Auditor) Steven Contos holds the following fluoride qualification: • Fluoride plant operator's certificate (NSW Health)
Lucy Parsons Atom Consulting	Lucy Parsons holds the following auditor qualifications • Exemplar Global TL-AU (Lead Auditor) Lucy Parsons holds the following fluoride qualification: • Fluoride plant operator's certificate (NSW Health)

Audit grades

The audit grade definitions used in assessing the auditee's performance against the requirements are set out in Table 1-3.

Table 1-3. Audit grades

Audit finding	Description
Compliant	Sufficient evidence is available to confirm that the requirements have been met.
Compliant (minor shortcomings)	Sufficient evidence is available to confirm that the requirements have been met apart from **minor shortcomings** which to date have not compromised the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes
Non-compliant (non-material)	Sufficient evidence is not available to confirm that the requirements have been met and the **deficiency does not adversely impact** the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes
Non-compliant (material)	Sufficient evidence is not available to confirm the requirements have been met and the **deficiency does adversely impact** the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.
No requirement	There is no requirement for the utility to meet this criterion within the audit period

Source: Audit Guideline Public Water Utilities (July 2019).

1.3 Regulatory regime

Sydney Water operates largely in a NSW context but must also have regard to matters outside of that jurisdiction, where those matters may affect how it does business. A summary of the key legal and regulatory instruments for Sydney Water is provided in Table 1-4.[1]

Table 1-4. Key legal and formal instruments relevant to Sydney Water operating licence[2]

Instrument	Relevance
Competition and Consumer Act 2010 (Cth)	An Act for the promotion of competition and fair trading and provision for consumer protection. Could apply to the 'fitness for purpose' of any product or service supplied.
Current version of the Australian Drinking Water Guidelines	These guidelines are called up under Sydney Water Operating Licence obligations.
Government Information (Public Access) Act 2009 (NSW)	Information may be requested from Sydney Water, which relates to aspects of the licence.
Sydney Water Act 1994 (NSW)	An Act which establishes Sydney Water, defining the functions and objectives of Sydney Water.
Sydney Water Operating Licence 2019-2023	A licence issued by the Governor under section 12 of the Sydney Water Act 1994 which enables Sydney Water to provide relevant services within its area of operations. This licence also gives effect to the operational audits (this audit) to which Sydney Water is subject.
Independent Pricing and Regulatory Tribunal Act 1992 (NSW)	Allows for the regulation of utilities such as Sydney Water including the administration and auditing of licences and pricing functions.
Memorandum of Understanding with NSW Health	Sets out the working relationship between NSW Health and Sydney Water.
Memorandum of Understanding with Environment Protection Authority 2015	Sets out the working relationship between Environment Protection Authority and Sydney Water.
Public Health Act 2010 (NSW)	The objectives of this Act are to protect and promote public health, control risks to public health, promote the control and prevent the spread of infectious diseases and recognise the role of local governments in protecting public health. Supporting Regulations are intended to support the smooth operation of the Act. Sydney Water has obligations under this Act including notifying the Minister of any situation that is likely to be a risk to public health.

[1] Intended to be illustrative, not exhaustive, for the purposes of this report.

[2] Where legislation is identified in this table, a reference to that legislation should be taken to include any Regulation/s made pursuant to it.

1.4 Quality assurance process

Our quality assurance approach to this audit involved peer review from a qualified auditor who was not part of the interview team. This process commenced at the development and submission of the audit questionnaires. Checks of information received were conducted and included aspects such as dates for audit scope compliance, veracity of information, coverage of the subject area being audited and depth of implementation. Professional scepticism (as per ASAE 3100) was applied as part of the document review and on-site audit. Auditors liaised frequently with each other. Support auditors were used for clauses where the audit load was heavy.

Throughout the audit report writing process, the documentation was proofread and cross-checked by the audit team members. An overall quality assurance review was conducted by the audit team leader and a peer review undertaken by a qualified auditor who was not part of the interview team.

2 Physical and virtual site visit

Field verification of Sydney Water's practices were undertaken through a combination of in person and virtual inspections. Due to COVID-19 protocols limiting visitors to site and across sites the water and sewage treatment site visits were undertaken virtually. This limited the sampling of physical records.

2.1 Pipe repair

An inspection of a reactive maintenance pipe repair (work order number 84450628) was undertaken on 7/9/2021. This job had been submitted on the 31/8/2021

Upon arrival at the site, the auditor was inducted and introduced by the Network Team Leader to two Production Employees. The pipe had already been exposed using a jetter and vacuum truck. A split had occurred within the roots of a tree stump adjacent to the service line valve.

The senior Production Employee explained he had expected the pipe to require slip lining, however the break was small enough that it could be clamped.

A dynamic risk assessment had been undertaken to identify the relevant safe work method statements. The relevant Safe Work Method Statements (SWMS) are ticked on the electronic form. It is not easy to view the detail of the selected SWMS from this form. We requested to view some of the SWMS (SMWS 11 and SMWS 20). The Network Team leader and Production Employee could not immediately bring up the requested SWMS. Within a brief time they located both documents in the system. The auditor noted that SWMS 11 on the system was revision 6. The copy the auditor had been provided was revision 3. This conflict indicates issues with document control.

SWMS 20 notes to carry out adequate flushing. When we queried what was meant by 'adequate' the response was 15 minutes or until clear. The team leader checked this advice with the Water Quality Scientist and confirmed this approach.

The senior Production Employee stated he kept hard copies in his truck but the vehicle he was in today was not his regular vehicle so he didn't have a copy with him.

We observed improvement opportunities in relation to pipe hygiene:

- The dynamic risk assessment does not alert the maintenance crews to consider site-specific water quality risks.
- Water quality and pipe hygiene requirements are not clear across the SWMSs and SOPs.
- Implementation of simple barriers such as plastic sheets to avoid placing fittings and tools in the dirt.
- Clearer messaging on pipe hygiene (for example the Unity Water 5 C's program; clean pipes, clearance, chlorination, cleanliness, clothing).

We have included an opportunity for improvement (OFI 4 .1.1-1) in Clause 4.1.1 regarding improved pipe hygiene practices.

During the site visit, the Network Team Leader demonstrated the use of ClickMobile – a dispatching program to manage and record the job. The use of Tensing, Sydney Water's Geographic Information System (GIS) program, was demonstrated to identify the stop valves, flushing points and number of properties affected.

The trucks were clean and well organised.

A spray of 1% sodium hypochlorite was used to disinfect the clamp and service line valve. Standpipes and connection points to the main were wiped with disinfectant prior to use.

2.2 Macarthur Water Filtration Plant

The site visit to Macarthur Water Filtration Plant (WFP) was undertaken by video conference on the morning of 16/9/2021. TRILITY staff started with a site overview on the SCADA control screen. The staff were able to demonstrate understanding of the water treatment process from the river to the distribution system where control is handed over to Sydney Water. A plant walk through was undertaken to confirm the process flow diagrams including the location of monitoring equipment. This included a detailed look around the inlet works including dosing points and the location of online analysers. DP1 pH meter was sighted on inlet works and DP11 pH meter was sighted after the ferric chloride dosing point. The filter gallery was inspected and the filter 9 outlet turbidity analyser was sighted (A-3009-1), showing a result of 0.006 NTU.

Valves arranged to show the filter-to-waste arrangement were sighted and staff understanding of the mechanism demonstrated. Filter-to-waste is used during ripening if turbidity exceeds 0.28 NTU.

The fluoridation room and accompanying staff change room was inspected, staff demonstrated understanding of the key controls including PPE, ventilation, signage, chemical storage, procedures to minimise manual handling, monitoring and fluoride waste handling requirements. Staff explained that there was an arrangement with the chemical supplier to share the 3 months chemical storage and that this arrangement was endorsed by NSW Health. The drain in the fluoridation room was explained to transfer water to the residual lagoons. Staff explained that all chemical tank bunds also transferred to the residual lagoons which can return to the head of the works. The primary indication that there is a spill are level probes in all the chemical storage bunds which send alerts. The fluoride lab was sighted and staff demonstrated the process for viewing standard operating procedures within the lab.

Staff demonstrated the process for accessing daily SCADA results. KOIOS was shown as a means of reviewing long-term data trends in lab and SCADA data.

Process work instructions were sighted. A database of procedure changes was sighted with document updates and descriptions of the changes.

SAP, TRILITY's corporate wide system for maintenance management, was sighted and the work order (WO # 4155129) for the chlorine maintenance seen during the site tour was extracted and opened. As this work is outsourced, the work order has limited information but demonstrates that the task is planned and scheduled.

We also obtained a report for all planned maintenance activities scheduled to occur at the plant between 1 July 2021 and 20 September 2021. The schedule includes the work order number, the description of the maintenance activity, the functional location of the asset to be maintained and the currently scheduled date for the task. This report helps demonstrate that Sydney Water's contractor is managing the assets to achieve performance and their expected useful life.

We also sighted TRILITY's asset management plan for the facility. This is a comprehensive plan that has been reviewed annually (last review 13 March 2021). The plan covers the service requirements (service levels, future demand) and goes on to set out detailed plans for maintenance and refurbishment and replacement as well as specifying the current year plan. This asset management plan should provide a sound basis for managing the WFP assets.

We reviewed the site Business Continuity Plan which was first prepared in October 2019 and last revised in March 2020. The Plan is based around a risk assessment to identify the highest risk to service continuity. These highest risks then have response actions identified. These high risks are:

- failure of electricity supply
- loss of chemical supply
- loss of critical staff
- critical equipment failure
- site programming failure.

We consider that the Business Continuity Plan is a sound basis for managing service continuity and help demonstrate implementation of Sydney Water's asset management system.

2.3 Liverpool Water Recycling Plant

Due to COVID-19 restrictions, the site visit to Liverpool WRP was undertaken by video conference on 16/9/2021. A demonstration of the SCADA and video walk through of the plant was undertaken to verify the process flow diagram. The staff at Liverpool WRP were able to demonstrate access to work instructions on BMIS. A tour of the laboratory was also undertaken and calibration stickers were observed on handheld and benchtop instruments and the current Laboratory analysis log sheet was on the bench completed to the current day.

The Liverpool WRP is a conventional activated sludge process with primary sedimentation, anaerobic digestion and biosolids dewatering. The operations team is part of the Georges River Hub. Mechanical and electrical maintenance is outsourced The local team performs in-house instrument calibrations, checks and valve exercising.

A number of key issues were discussed and are summarised below:

The CCPs were clearly labelled with the CCP number and critical limits. The signs however were laminated printed copies which would be likely to deteriorate in the outdoor environment and require regular replacement to remain legible.

Weekly Hub planning and performance meetings were held and include process performance and maintenance and planning for the next week as agenda items.

All instruments in the laboratory had calibration stickers and were not overdue. Standards used for pH instrument calibration were observed and were not past the use by date on the label. The date the standards were opened was also written on each bottle, however Sydney Water staff were unable to explain how long after this date the standards should be disposed of.

We requested and received preventative maintenance plans for the secondary clarifiers equipment. We were given an output from Maximo showing 11 planned maintenance tasks. The tasks include three monthly inspections for analysers (ammonia, pH and suspended solids) and annual inspections for the low voltage electrical starters on the sludge scrapers. Rotating equipment is inspected and lubricated at a two month frequency. The planned maintenance information provided by Sydney Water provides assurance that Sydney Water is proactively maintaining its assets to achieve their expected useful life.

We also received and reviewed condition assessment reports for the guardrail at the chlorine tank area. The inspection includes condition and compliance considerations. We also reviewed a detailed condition assessment report for Digester No.1. The inspection was undertaken in September 2018 which is outside of the audit period but is relevant to the site inspection. The digesters are critical assets with a wide range of civil, structural and mechanical and electrical assets and therefore condition assessment is important for their management through their lifecycle. We found the condition assessment to be detailed and comprehensive in identifying defects and areas of interest relating to components of the digester. This report is demonstration that Sydney Water is implementing its asset management system for these assets by gaining information on which to be asset management decisions.

Clause 1.7 – Pricing

Clause 1.7.1

Table 2-1. Clause 1.7.1 compliance grade

Subclause	Requirement	Compliance grade
1.7.1	Sydney Water must set the level of fees, charges, and other amounts payable for its Services in accordance with: a) the terms of the Licence; b) the Act; and c) any applicable maximum prices or methodologies for fixing maximum prices determined under the IPART Act.	Compliant

Risk	Target for full compliance
Failure to comply with the requirements of this obligation presents a risk that Sydney Water is either overcharging its customers or failing to recover the costs of providing its services.	Evidence that Sydney Water has set the level of fees, charges and other amounts payable for its Services subject to the terms of the Licence, the Act and the maximum prices and methodologies determined by IPART.

Summary of reasons for grade

Sydney Water demonstrated that it has in place appropriate procedures to guide staff to help ensure that prices are correctly calculated and applied. These procedures include steps for independent checks made by staff on the calculation of fees and charges each year, with records to be retained, and the conduct of random audits.

Sydney Water demonstrated that it had set the level of fees, charges, and other amounts payable for its services during the audit period in accordance with the relevant IPART Determination.

This clause is graded Compliant.

Discussion and notes

This clause requires that Sydney Water set the level of fees, charges and other amounts payable for its services in accordance with the terms of its operating licence, the Sydney Water Act 1994 (NSW) and any applicable maximum prices or methodologies for fixing maximum prices determined under the Independent Pricing and Regulatory Tribunal Act 1992 (NSW).

Sydney Water uses a variety of systems to generate, process and issue bills and invoices for fees, charges and other amounts payable for its services. These systems include SAP, Sydney Water Tap in™ (including Developer Direct), eDeveloper and Retail Ancillary Services.

A new IPART Determination (Review of prices for Sydney Water from 1 July 2020: Final report) came into effect on 1 July 2020 for the forward four-year period. As a result, the

consumer price index was not required to be applied in 2020/21 to the fees, charges and other amounts payable set by the IPART Determination.

Sydney Water has published on its website prices for residential services, non-residential services and other services. Sydney Water also provided to us a Waterwrap newsletter that was issued to customers for August – October 2020, which informed customers about the new IPART Determination and the specific water usage prices under this determination.

Procedures

Sydney Water has in place an Implementing IPART determined retail prices procedure (SWIM 775467, Version 5). This procedure documents the process for implementing IPART determined retail prices, responsibilities and accountabilities, applicable billing systems, training and competencies, and document ownership. The responsibilities and applicable billing systems for ancillary charges, such as charges for conveyancing certificates, are documented in Appendix A of the procedure. The procedure was last issued on 25 February 2020.

Sydney Water also has in place a number of supporting detailed procedures, work instructions and tools relating to specific price categories and billing systems:

- Annual IPART price changes & others procedure (SWIM 786730, Version 3)
- Update e-Developer Ancillary Service Charges procedure (D0000695, Version 3)
- RAS: Updating prices for products provided via Property Link procedure (D0000861, Version 01)
- RAS: Updating prices for products provided via Sydney Water Tap in procedure (D0000864)
- Minor Service Extension price calculation and tracking procedure
- Recycled water developer charges calculation and tracking procedure (789257, Version 3)
- e-Developer Recycled Water Developer Charges Management procedure
- Update e-Developer CPI for Recycled Water Developer Charges for DSP areas procedure
- Updating e-Developer CPI For Recycled Water Developer Charges for DSP Areas work instruction
- e-Developer: Create New DSP calculator for existing and new DSP Area work instruction
- Recycled water developer charges_existing scheme v2 spreadsheet (Version 2)
- Recycled water developer charges_new scheme v2 spreadsheet (Version 2).

Internal audit

In 2020-21, Sydney Water conducted an internal audit into its compliance with IPART's determined prices. As part of this internal audit, 18 price categories were selected by Sydney Water, representing over 90% of the volume and value of the bills issued. For each price category, Sydney Water collated a sample of evidence, including IPART price lists endorsed and approved at managerial levels within Sydney Water, screenshots of pricing web pages from Sydney Water's website, Sydney Water bills, and invoices from PropertyLink brokers/Sydney Water Tap in™. The internal audit, documented in the

Operating Licence pricing audit 2020-21 memorandum, found no non-compliances and was endorsed and approved at managerial levels.

SDP uplift charge

Sydney Water has developed an Implementing the drought uplift water usage charge procedure (SWIM 2905867, Version 1). This procedure documents the process and task details for implementing the drought uplift water usage charge, definitions, accountabilities, training and competencies, document ownership, and change history. The procedure was approved for issue by the Head of Business, Customer Programs on 18 February 2021. We confirmed that the criteria for triggering and ceasing the drought uplift water usage charge, as documented in the associated procedure, reflect the 2020 – 2024 determination made by IPART.

Sydney Water also provided to us the price list for 2020-21 (SWIM 2946730_ Price path - 2020-21 Final with 5 DP_ signed_20200619.xlsx), which includes the "Uplift on Drought Response Days" water usage charge. This price list was checked, endorsed and approved by Sydney Water, with endorsement and approval provided at managerial levels. We confirmed that the drought uplift water usage charge in the 2020-21 price list reflects the 2020 – 2024 determination made by IPART.

Recommendations

No recommendations were made

Opportunities for improvement

No opportunities for improvement were identified

Clause 2.2 – Obligation to make services available

Clause 2.2.1

Table 2-2. Clause 2.2.1 compliance grade

Subclause	Requirement	Compliance grade
2.2.1	Sydney Water must ensure that Services for the supply of Drinking Water and disposal of Wastewater are available on request for connection to any Property situated in the Area of Operations for which a connection is available.	Compliant

Risk	Target for full compliance
Failure to comply with this obligation means that customers would not have access to water and sewerage services which in turn might have economic, public health and environmental impacts. Compliance with this clause also allows Sydney Water to impose conditions to ensure safe, reliable and financially viable services	Evidence that Sydney Water has appropriate processes and systems in place to enable customers to request connection, test that the connection is in the Area of Operations and consistent with the conditions imposed by Sydney Water and then to enable the connection to be made.

Summary of reasons for grade

Sydney Water demonstrated that it has in place appropriate information systems and processes to help ensure that services for the supply of drinking water and disposal of wastewater are available on request for connection to any property situated in the area of operations for which a connection is available.

This clause is graded Compliant.

Discussion and notes

This clause requires that Sydney Water ensure that services for the supply of drinking water and disposal of wastewater are available on request for connection to any property situated in the area of operations for which a connection is available.

Sydney Water has published its area of operations on its website. Additionally, Sydney Water's area of operations is defined in Section 10 of the Sydney Water Act 1994, which also stipulates the requirements for reducing or expanding the area of operations.

Customers apply for water and wastewater connections via Sydney Water's online application portal, Sydney Water Tap in™. A range of data validation measures are built into Sydney Water Tap in™, such as the validation of the customer's contact details, property address, and asset to which the service will be connected. If a customer selects a property that is outside Sydney Water's area of operations, an error message is automatically returned ("The property you searched for was not found"). Sydney Water has published on its website the process for customers to apply for these connections.

The conditions under which Sydney Water allows water or wastewater connections to be made are stipulated in its Connecting to our systems policy (document number DD_043729 - SW108 10/20, Version 3). This policy was last issued on 20 October 2020.

Under the Connecting to our systems policy, the conditions under which water or wastewater connections can be made are as follows:

- Water connections:
  - your property has a frontage of at least two metres to a connectable water main or recycled water main on any boundary
  - there is adequate pressure and flow in that main to support your connection
  - your connection won't compromise the service we offer other customers.
- Wastewater connections:
  - you have access to a connectable main in or next to your property.
  - The Connecting to our systems policy also sets out the conditions under which Sydney Water may not approve water connections or will not approve wastewater connections. These conditions are as follows:
- Water connections:
  - there's not enough water pressure or flow in any main to supply your property
  - water demand from the connection will disadvantage existing customers or cause us to breach our operating licence
  - your private service line would cross another private property to connect to our main and there is no easement or property owner agreement to allow you access to the pipes
  - the number of private services from the end of a water main would affect service quality.
- Wastewater connections:
  - there is no wastewater service available in your area
  - the available wastewater main is not a connectable main
  - there is not enough capacity in existing wastewater mains for your connection
  - your connection or your wastewater will damage our assets.
  - According to the Connecting to our systems policy, the provision of written permission from Sydney Water prior to a water or a wastewater connection being made is a requirement of Section 48 of the Sydney Water Act 1994. We note that this statement should instead refer to Section 48A of the Act, which states that "a person must not do any of the following unless authorised to do so by the [Sydney Water] Corporation". In this section of the Act, "following" refers to connecting any pipe or fitting to, altering or using a work owned by Sydney Water. As one of the conditions for making a water connection is the availability of "adequate" pressure and flow in a connectable water main, we suggest that Sydney Water define and document "adequate pressure and flow" (OFI 2.2.1-2). This allows Sydney Water to ensure safe, reliable and financially viable services when making connections available to new customers.

The procedure for Sydney Water staff to assess and process water connection applications is documented in the Sydney Water Tap in™ Processing a water connection Staff Guide (SWIM 1260446, Version 1.2). This procedure also documents

accountabilities, training and competencies for key staff, and document control. The procedure was last issued on 2 February 2021. While we were not provided with a corresponding procedure for wastewater connection applications, Sydney Water advised that the process is similar. The procedure for assessing and processing wastewater connection applications is not documented elsewhere. We recommend, as an opportunity for improvement (OFI 2.2.1-1), that Sydney Water update the Sydney Water Tap in™ Processing a water connection Staff Guide with the procedure for assessing and processing wastewater connection applications.

During the audit, we created an example water connection application in order to sight the process undertaken by customers to apply for a connection. We also selected a property outside Sydney Water's area of operations and confirmed that an error message was automatically returned.

During the audit, we queried the Sydney Water Tap in™ Dashboard to identify an example application that was submitted during the audit period and subsequently placed on hold due to inadequate pressure being available. We confirmed that the application related to a proposed connection in North Richmond, which is defined as a low-pressure cluster within Sydney Water's operating licence.

Recommendations

No recommendations were made

Opportunities for improvement

OFI 2.2.1-1: There is an opportunity for improvement for Sydney Water to update the Sydney Water Tap in™ Processing a water connection Staff Guide with the procedure for assessing and processing wastewater connection applications.

OFI 2.2.1-2: There is an opportunity for improvement for Sydney Water to define and document "adequate pressure and flow". This would allow Sydney Water to ensure safe, reliable and financially viable services when making connections available to new customers.

Clause 2.2.2

Table 2-3. Clause 2.2.2 compliance grade

Subclause	Requirement	Compliance grade
2.2.2	Sydney Water must provide Services for the supply of Drinking Water and disposal of Wastewater on request to any licensee under the WIC Act, where that licensee is connected to (or where a connection is available in respect of that licensee to) Sydney Water's water supply system or sewerage system.	Compliant

Risk	Target for full compliance
Failure to comply with this obligation presents a risk that Sydney Water may not provide services to a WIC Act licensee, or would only provide services on unreasonable terms and conditions. This would have consequences for competition in service provision.	Evidence that Sydney Water has appropriate processes and system in place to enable WIC Act licensees to request connection, test that the connection is in the Area of Operations and consistent with the conditions imposed by Sydney Water and then to enable the connection to be made.

Summary of reasons for grade

Sydney Water demonstrated that it has in place appropriate information systems and processes to help ensure that services for the supply of drinking water and disposal of wastewater are available on request for connection to any WIC Act Licensee situated in the area of operations for which a connection is available.

This clause is graded Compliant

Discussion and notes

This clause requires that Sydney Water ensure that services for the supply of drinking water and disposal of wastewater are provided on request to any licensee under the Water Industry Competition Act 2006 (WICA), where that licensee is connected to (or where a connection is available in respect of that licensee to) Sydney Water's water supply system or sewerage system.

The process for applying for, assessing and processing connection applications from customers of WICA licensees is identical to the process summarised for Clause 2.2.1. Sydney Water noted that connection applications are not submitted by WICA licensees but are submitted by others on their behalf.

Sydney Water maintains a database of WICA licensees. This database is extracted from the database published by IPART on its website. We note that the database maintained by Sydney Water does not include document control information, such as the database owner and the date on which the database was updated.

Recommendations

No recommendations were made

Opportunities for improvement

No opportunities for improvement were identified.

Clause 3.1 – Economic approach for water conservation

Clause 3.1.1

Table 2-4. Clause 3.1.1 compliance grade

Subclause	Requirement	Compliance grade
3.1.1	Sydney Water must maintain a water conservation program consistent with the Current Economic Method.	Compliant

Risk	Target for full compliance
If the water conservation program is not consistent with the Current Economic Method there is a risk that investment in conservation does not represent good value for money	Evidence that the water conservation program reflects the Current Economic Method and in particular, that the decision criteria for developing the program reflects the expected value for water.

Summary of reasons for grade

Sydney Water has provided evidence that its Water Conservation Program reflects the criteria required by the Current Economic Method and that the criteria for including initiatives in the program is based on the expected value of water. Sydney Water has also demonstrated that it is taking a programmatic approach to water conservation. While the Water Conservation Report is important evidence for this clause, there is substantial further information regarding the management of the program that is outside of this report. This clause is considered Compliant.

Discussion and notes

Economic Level of Water Conservation Methodology and Water Conservation Report

This clause requires that Sydney Water maintain a water conservation program that is consistent with the Current Economic Method.

Sydney Water has developed a methodology for determining the economic level of water conservation (the Current Economic Method), documented in Determining Sydney Water's Economic Level of Water Conservation: Part A: The ELWC Methodology (SWIM 581627, Version 2). This methodology describes Sydney Water's approach to calculating the economic level of water conservation, including formulae and input parameters, and was approved by IPART in 2016. Under this methodology, candidate projects are to be selected for inclusion in Sydney Water's water conservation program if the levelised cost of the project is less than or equal to the expected value of water.

The economic level of water conservation methodology was last issued internally in September 2021. We note that this version is yet to be published on Sydney Water's website. We also note that the version currently published on Sydney Water's website does not contain document control information. Sydney Water has advised that it is in

the process of uploading a dated version of the methodology with version control to its website.

Sydney Water's Reporting Manual requires that it prepare an annual Water Conservation Report. Among other inclusions, the Water Conservation Report must include information on Sydney Water's water conservation program for at least the next five financial years. Accordingly, Sydney Water has prepared a Water Conservation Report: 2020 – 2021.

Section 3 of the Water Conservation Report: 2020 – 2021 includes the following tables that summarise Sydney Water's water conservation program for 2021/22 to 2025/26:

- Table 3.1, page 20: Established water efficiency projects that have been selected for 2021/22. For each project, this table includes the name of the project, total annual investment, number of "interventions" (e.g. number of participants), and total estimated annual water savings.
- Table 3.1, page 21: Recycled water, community awareness, and research and innovation activities that are planned for 2021/22. In its Water Conservation Report: 2020 – 2021, Sydney Water has noted that the "COVID-19 pandemic and associated lockdowns and restrictions directly impact the delivery of programs and the ability to achieve targets". Investment will be made into the additional activities listed in this table.
- Table 3.2, page 22: Water efficiency plan for 2021/22 to 2025/26. For each candidate project, this table includes the name of the project, whether it meets the economic level of water conservation, projected annual water savings, total annual demand reduction, and total cumulative savings.
- Table 3.3, page 23: Water leakage plan for 2021/22 to 2024/25. This table includes the economic level of leakage in each year of the forward four-year period, along with the total annual investment and total annual water savings for each leakage management sub-program. We note that this table covers the forward four years only, rather than the forward five years.
- Table 3.4, page 24: Projected recycled water savings for 2021/22 to 2025/26. This table includes the projected annual water savings.

Sydney Water has developed several mechanisms for the identification of potential candidate projects – a Sydney Water innovation platform, an expression of interest form, and targeted workshops led by the Research and Innovation Team. In its Water Conservation Report: 2020 – 2021, Sydney Water states that it also "participates in several industry associations and works in collaboration with Government and standards committees in order to learn, share and combine efforts".

Once potential candidate projects are identified, they are categorised as "research and innovation", "early lifecycle" or "established programs". Sydney Water uses the "research and innovation" and "early lifecycle" phases to investigate the costs and benefits of potential candidate projects prior to assessment against the economic level of water conservation.

We note the following in relation to Sydney Water's water conservation program for 2021/22 to 2025/26:

1. In its Water Conservation Report: 2020 – 2021, Sydney Water has noted that a new project, WaterFix Commercial, has been progressed from the "early lifecycle" phase to an "established program" within the forward five-year program as a result of meeting the economic level of water conservation. Two candidate projects that did not meet the economic level of water conservation (Rainwater Tank Repair and Love Your Garden) are listed as such in Table 3.2 of the report and, therefore, are excluded from the forward five-year program. However, beyond these projects, the report does not include a long list of candidate projects that were assessed against the economic level of water conservation.
2. Sydney Water has established a process through which the costs and benefits of potential candidate projects are first investigated as either "research and innovation" projects or "early lifecycle" projects. However, based on the Water Conservation Report: 2020 – 2021, it is not clear how potential candidate projects are prioritised for investigation (i.e., how value for money is justified).
3. Based on the Water Conservation Report: 2020 – 2021, it is not clear whether the activities in Table 3.1 of the report (recycled water, community awareness, and research and innovation activities that are planned for 2021-22) meet the economic level of water conservation. If these activities have not been assessed against the economic level of water conservation, it is not clear how these activities were prioritised for investment.
4. Based on the Water Conservation Report: 2020 – 2021, it is not clear which recycled water and leakage management initiatives are funded by the water conversation program budget and which initiatives are funded elsewhere.
5. Sydney Water has included a "Program governance and decision making" appendix (Appendix E) in its Water Conservation Report: 2020 – 2021. We note that this is a high-level, one-page summary that effectively outlines the purpose of the Water Conservation Portfolio Control Board and the mechanisms for identifying potential candidate projects (e.g. the Sydney Water innovation platform).

   Sydney Water has also included in Appendix B ("Method overview") information on the methods used to estimate the water savings from various projects. However, this does not include all projects selected for the forward five-year program, as WaterFix Commercial and leakage management are excluded.

   Overall, neither Appendix B nor Appendix E document how the overall performance of the water conservation program, or the effectiveness of individual projects, is monitored in a regular, consistent and structured manner. The inclusion of the method to assess the effectiveness of the water conservation measures is a requirement of Sydney Water's Reporting Manual.
6. The levelised cost of each project selected for the forward five-year program is not included in the Water Conservation Report: 2020 – 2021. The inclusion of the

cost of each water conservation measure per kilolitre of water saved is a requirement of Sydney Water's Reporting Manual.

In relation to Finding 5 above, Sydney Water conducted a mid-year review of the 2020-21 water conservation program in December 2020. The mid-year review identified several recommendations, including proposed changes to the 2020-21 water conservation program budget following a review of the forecast year-end expenditure against the original budget. As a result of the review, it was recommended that $700,000 be reallocated from the water conservation program budget to other Sydney Water initiatives.

While the results of this review are documented within an internal report (Water Conservation: Mid financial year progress report, Version 1.5), a program approach requires that ongoing monitoring of the performance of the water conservation program, and effectiveness of individual projects, is required as part of business as usual under a programmatic approach and also by the Reporting Manual. While there are alternatives to a mid-year review to meeting the requirements for the Water Conservation program if this was not undertaken in future then these requirements would need to be met through other means.

Based on our review of the Water Conservation Program, as documented in the Water Conservation Report, we consider that there are opportunities for Sydney Water to improve its documentation and reporting of the Program (OFI 3.1.1-1). These opportunities comprise:

- Include more information on the long list of potential opportunities or projects under consideration
- Include more information on how projects are initially prioritised for investigation
- Be explicit where initiatives have been included in the Water Conservation Program not on the basis of the economic level of water conservation. Secondly, identify the justification on which these initiatives have been included in the program
- Be explicit as to whether initiatives are funded by the Water Conservation Program or outside of the Program
- Include more detailed information on governance and decision making for the Water Conservation Program.

Changes to methodology

As of 1 November 2019, the economic level of water conservation methodology can only be changed by the Minister for Water, Property and Housing. Sydney Water advised that, in 2020-21, the Minister for Water, Property and Housing did not issue a direction to update the methodology.

Conclusion

Sydney Water has provided evidence that its Water Conservation Program reflects the criteria required by the Current Economic Method. Sydney Water has also provided evidence that it has taken more of a programmatic approach to water conservation. This includes the increased information within the Water Conservation Report. In addition to the information in the Water Conservation Report, there is substantial

information regarding the management of the program that is outside of this report. For example, minutes of the Portfolio Control Board meetings and the mid-year review. While we are satisfied that Sydney Water has taken a programmatic approach to the Water Conservation Program, we consider that these monitoring, review and corrective actions activities need to be part of business as usual for Sydney Water to meet its obligations under this clause and the related water conservation clauses in future.

Recommendation

No recommendations were made.

Opportunities for improvement

OFI 3.1.1 – 1 We suggest that Sydney Water considers the following opportunities to improve its documentation and reporting of the Water Conservation Program. These opportunities comprise:

- Include more information on the long list of potential opportunities or projects under consideration
- Include more information on how projects are initially prioritised for investigation
- Be explicit where initiatives have been included in the Water Conservation Program not on the basis of the economic level of water conservation. Secondly, identify the justification on which these initiatives have been included in the program
- Be explicit as to whether initiatives are funded by the Water Conservation Program or outside of the Program
- Include more detailed information on governance and decision making for the Water Conservation Program.

Clause 3.1.2

Table 2-5. Clause 3.1.2 compliance grade

Subclause	Requirement	Compliance grade
3.1.2	Sydney Water must implement water conservation measures that have been assessed as economic as determined by the Current Economic Method.	Compliant

Risk	Target for full compliance
If the water conservation program is not implemented, then investment is inefficient and future supply augmentation options may be brought forward	Evidence that conservation measures assessed as economic have been implemented, that is funded and delivered or planned for delivery.

Summary of reasons for grade

The Water Conservation Report details the activities forecast to be undertaken by Sydney Water for the audit period, the actual expenditure and the outturn estimated savings compared with that forecast. This analysis shows that Sydney Water implemented water conservation measures that were consistent with the Economic

Method and which, in aggregate, achieved estimated savings that exceeded that forecast. This clause is graded Compliant.

Discussion and notes

This clause requires that Sydney Water implement water conservation measures that have been assessed as economic as determined by the Current Economic Method.

As noted against Clause 3.1.1, Sydney Water has documented a methodology for determining the economic level of water conservation (the Current Economic Method). Sydney Water also prepares an annual Water Conservation Report, which outlines its water conservation program for the next five financial years and summarises the implementation of this program in the previous financial year.

Implementation of water conservation activities in 2020-21

The Water Conservation Report details the activities forecast to be undertaken by Sydney Water for the audit period, the actual expenditure and the outturn estimated savings compared with that forecast. The measures listed are across the following categories:

- Water efficiency
- Water leakage
- Recycled water
- Community awareness
- Sector collaboration and regulator measures.

Each of the activities within the categories are described in the Water Conservation Report. Through this information, Sydney Water has demonstrated that it has identified measures for implementation that are consistent with the Current Economic Method and implemented these measures to achieve forecast savings. We therefore conclude that Sydney Water has met its obligations under this clause.

However, we make the following observations regarding the scope of the Water Conservation Program:

- The water efficiency savings category is more mature in number of measures and reported information compared with the other categories. This is understandable as this category is largely consistent with past years while the other categories are new or substantially revised. We expect that the reporting against the other categories will mature over time.
- The 2020-21 Water Conservation Report also makes increased reference to projects that are not funded by the water conservation program budget, such as the operation of recycled water plants against which expenditure of $32M is listed. The inclusion of expenditure that appears to be on an inconsistent basis makes it difficult to understand what proportion of the budget was expended, what water savings were realised, and how the total volume of water savings compares to the total investment made.

- A substantial proportion of initiatives are in “early lifecycle”, particularly enhanced leak response, and do not have estimated actual savings associated with them. This makes assessing individual initiatives difficult.

While the above observations make it difficult to clearly identify the forecast and actual costs and savings achieved from the entire Water Conservation Program at this time, as we have noted, we expect that Sydney Water will improve on this in future. We consider that there is an opportunity for Sydney Water to review how costs are presented within the Water Conservation Program to confirm whether costs for recycled water should be reported alongside the cost of other initiatives. Note that this does not mean that these costs should necessarily be excluded but there may be benefit in presenting them differently.

Recommendation

No recommendations were made.

Opportunities for improvement

OFI 3.1.2-1: Review how costs are presented within the Water Conservation Program to confirm whether costs for recycled water should be reported alongside the cost of other initiatives. We note that the 2020-21 Water Conservation Report includes the operation of recycled water plants ($32M), which is not funded by the water conservation program budget. The inclusion of these costs makes it difficult to understand what proportion of the water conservation program budget was expended, what water savings were realised, and how the total volume of water savings compares to the total investment made.

Clause 3.2 – Water Planning

Clause 3.2.4

Table 2-6. Clause 3.2.4 compliance grade

Subclause	Requirement	Compliance grade
3.2.4	Sydney Water must implement any action that: a) Sydney Water is responsible for delivering under the Metropolitan Water Plan; or b) the Minister directs, in writing, Sydney Water to implement.	Compliant

Risk	Target for full compliance
If Sydney Water does not undertake water planning required of it, water security planning may be less efficient and effective than otherwise.	Evidence that Sydney Water has implemented actions required of it under the Metropolitan Water Plan or as directed by the Minister.

Summary of reasons for grade

Sydney Water has provided sufficient evidence to demonstrate that it has implemented the actions required of it under the Metropolitan Water Plan which includes implementing measures in the Water Conservation Report and investigating the benefits of recycled water, stormwater management and local integrated water solutions. Further, Sydney Water has complied with a direction from the Minister during the audit period to take on the water supply augmentation planning function for Greater Sydney.

This clause is considered to be Compliant.

Discussion and notes

This clause requires that Sydney Water implement any action that it is responsible for delivering under the Metropolitan Water Plan or that it is directed by the Minister to implement.

Obligations under the Metropolitan Water Plan

The Metropolitan Water Plan was last updated in 2017. Under the 2017 Metropolitan Water Plan, Sydney Water is explicitly required to:

- finalise the Water Conservation Report by September 2017 and prepare this annually
- implement the measures in the Water Conservation Report as required
- investigate the benefits of investing in recycled water, stormwater management, local integrated water solutions and water conservation programs.

As discussed in Clause 3.1, Sydney Water has prepared a Water Conservation Report for 2020-21, which outlines its water conservation program for the next five financial years and summarises the implementation of this program in the previous financial year. We concluded that Sydney Water had met its obligations under this clause.

In order to investigate the benefits of investing in recycled water, stormwater management, and local integrated water solutions, Sydney Water advised that it has undertaken the following actions:

- held monthly meetings of the Recycled Water as a Product Leadership Group
- developed a Recycled Water Position Statement
- continued to secure servicing for recycled water and stormwater.

As evidence, Sydney Water provided to us its Recycled Water Position Statement (Version 4). This position statement provides an overview of Sydney Water's position on recycled water, how it will implement its position, context within the supporting Sydney Water Strategy 2020 – 2030, case for change and rationale, and challenges. The position statement was last issued on 11 May 2021.

Sydney Water also provided to us its Recycled Water as a Product: Portfolio Management Plan (Version 4). This plan outlines the strategic and planning context for recycled water, importance of recycled water to Sydney, barriers and enablers for cost-effective water recycling, current state of play, and mechanisms for portfolio management. The Plan was last issued on 15 October 2020. Additionally, Sydney Water provided to us a risks, actions, issues, decisions and enablers register that it has progressively populated for recycled water.

While the above demonstrates progress in investigating the benefits of investing in recycled water, Sydney Water did not provide to us evidence of investigating the benefits of investing in stormwater management or local integrated water solutions. However, the Metropolitan Water Plan does not explicitly define the expectations for this activity or the assigned roles, responsibilities or target timeframes.

Ministerial directions

On 22 January 2021, Sydney Water received a direction from the Minister for Water, Property and Housing (B20/10727) to take on the water supply augmentation planning function for Greater Sydney, which was previously held by WaterNSW. Under the Ministerial direction, Sydney Water is required to undertake the following immediate actions:

- enter into a memorandum of understanding with WaterNSW by 31 January 2021
- agree and implement the arrangements for the transfer of the data, analysis and materials relevant to the Greater Sydney Desalination Program from WaterNSW to Sydney Water by 28 February 2021, or later date agreed by the parties
- publish the letter on the section of Sydney Water's website relevant to its operating licence
- continue to develop an Emergency Drought Response Plan and Long-Term Capital and Operational Plan by 31 December 2021.

Sydney Water provided to us the signed memorandum of understanding. We confirmed that the memorandum of understanding was signed prior to 31 January 2021. We also confirmed that Sydney Water has published the Ministerial direction on the section of its website relevant to the operating licence.

Sydney Water advised that it has established a steering committee with WaterNSW ("Steerco") for the transfer of the water supply augmentation planning function. We

sighted the Supply Augmentation Actions and Data Sharing Register used to capture information requests and actions arising from Steerco meetings. We confirmed that the earliest information requests and actions were captured prior to 28 February 2021. This illustrates that arrangements were agreed and implemented prior to 28 February 2021 for the transfer of the data, analysis and materials relevant to the Greater Sydney Desalination Program.

Sydney Water advised that the Emergency Drought Response Plan is on track for completion by the extended due date (1 December 2021). As evidence, Sydney Water provided to us the current project program for the Emergency Drought Response Plan. We reviewed the project program and confirmed that, out of the 32 tasks scheduled for completion by the time of the audit, 27 were completed.

Sydney Water advised that it has agreed with WaterNSW and the Department of Planning, Industry and Environment to postpone the completion of the Long-Term Capital and Operational Plan. The completion of the Long-Term Capital and Operational Plan has been postponed to allow the outcomes of the Greater Sydney Water Strategy to be incorporated. The Greater Sydney Water Strategy was released for public consultation on 28 September 2021 and is anticipated to be finalised in early 2022. Sydney Water advised that a formal extension of the due date for the Long-Term Capital and Operational Plan is currently being sought.

We note that Sydney Water's operating licence explicitly refers to the Metropolitan Water Plan and that this will need to be updated to reflect the Greater Sydney Water Strategy once finalised. We also note that the Metropolitan Water Plan does not explicitly identify actions, responsible agencies and timeframes for completion.

Recommendation

No recommendations are made.

Opportunities for improvement

No opportunities for improvement were identified.

Clause 4.1 – Drinking water

Clause 4.1.1

Table 2-7. Clause 4.1.1 compliance grade

Subclause	Requirement	Compliance grade
4.1.1	Sydney Water must maintain a Management System that is consistent with the Australian Drinking Water Guidelines and any requirements relating to Drinking Water specified by NSW Health (the Drinking Water Quality Management System)	Compliant (minor shortcomings)

Risk	Target for full compliance
Without a Water Quality Management System, the risk posed to public health from non-compliance with this clause could be significant.	Systems and processes in place that meet the requirements of the Australian Drinking Water Guidelines Framework for Management of Drinking Water Quality and ensure the Water Quality Management System remains up to date.

Summary of reasons for grade

Sydney Water has demonstrated that it maintained a management system consistent with the Australian Drinking Water Guidelines (ADWG) with minor shortcomings in the following areas:

- the Drinking Water Management Manual had sections that were out of date (particularly element 8)
- gaps in the Macarthur Water Filtration Plant (WFP) Drinking Water Quality Management Plan (This applies across most elements. We do not provide commentary on all aspects in the discussion below)
- incorrect document links in Helix
- currency of Helix (including text containing out of date references, incorrect document links and inconsistency in operational documentation recorded in Helix)
- processes to manage site specific stakeholders to ensure adequate risk communication and avoidance of control degradation (identified example of expired leases, where the leases require the lessee to manage the grounds with approved chemicals)

We have seen sufficient evidence to confirm that the requirements have been met apart from the identified shortcomings, which to date has not compromised the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes. This clause is graded Compliant (minor shortcomings).

Discussion and notes

In considering the 'maintain' requirement of this clause, we audited the water quality management system against the requirements of the ADWG Framework for Management of Drinking Water Quality (the Framework) and tested where documents have been maintained (i.e. that they remain current). The audit scope was for Elements 1 to 6 and 8 to 10 of the Framework. During the audit, we focused on North Richmond WFP, Macarthur WFP and pipe repair procedures.

Sydney Water has an overarching Drinking Water Management Manual (BMIS0213 version 4) that outlines how the organisation addresses its obligations to have a DWQMS. The Drinking Water Management Manual provides an overarching, high level summary of Sydney Water's DWQMS, and how it satisfies the 12 elements under the ADWG Framework. It documents how Sydney Water manages drinking water quality across all systems.

Sydney Water stores the system-specific Drinking Water Quality Management Plans in Helix, an online Business Model Repository. Helix is a road map that connects the different water quality management systems from WaterNSW BOOs and SDP. It includes links to operational procedures which are specific to a WFP or Network. Helix demonstrates Sydney Water's approach to continuous improvement in drinking water quality management and provides greater clarity in linking Sydney Water's procedures and processes with the requirements of the DWQMS and the ADWG Framework.

In Helix each action of the in ADWG Framework lists:

- the key activities
- who is accountable
- who is responsible
- the frequency of the activity
- supporting apps and documents.

Helix links directly to the Sydney Water record systems (BMIS, SWIM). We were provided access to Helix as part of the audit preparation. We could see links to the subordinate documents and records in systems such as BMIS and SWIM but did not have access to these subordinate systems. During the interviews the links through to these subordinate systems were demonstrated. A couple of links did not link through to the correct document including:

- Compliance Accountability Register linked to the 2019 draft
- Emergency Management procedure (D0000507) linked to the 2019 version

We observed in the remote environment that documents took a significant period of time to download when accessed from Helix. We acknowledge the documents were being opened via remote access concurrently with an MS Teams call and the time taken to open in this way is impacted by remote access and the home internet speed of those involved in the audit. We noted the increased risk of downloading and using uncontrolled documents to avoid download delays.

Sydney Water advised that "BMIS is used for day-to-day access to documents by Sydney Water employees. Helix has been developed to demonstrate how the documentation meets the requirements of the ADWG but is not used by operational teams to find documents relevant to them."

We found out-of-date references in Helix and the supporting documentation. These are documented in the relevant sections below.

The Macarthur WFP, operated by TRILITY operates under Sydney Water's Operating Licence. TRILITY has a drinking water management plan (MAC-PLN_005 Macarthur WFP Drinking Water Quality Management Plan) and supporting systems aligned to the 12 elements. Like the plants operated by Sydney Water, the Macarthur WFP operates

under a combination of ADWG actions addressed by Sydney Water (such as actions under element 8 community engagement and awareness) and site specific actions. We found that the Macarthur WFP Drinking Water Quality Management Plan did not addresses all the actions expected for a scheme-specific plan. For example we found a gap in the documentation of corrective actions (element 4). It is not the role of the audit to conduct a full gap analysis of the document, so not all shortcomings are noted in the element-by-element discussion.

Some of the language in the document articulates intention rather than documenting the drinking water management system. For example, the plan states "Trigger and alarm levels will be set for on-line instruments" rather than "Trigger and alarm levels are set for on-line instruments" which implies they are not currently set. Where this language was used, we were unable to determine from the documentation what was in place and what was not yet in place.

We have made a recommendation (Recommendation 4.1.1-2) to address the shortcomings with the Macarthur WFP Drinking Water Quality Management Plan.

In the Questionnaire Sydney Water advised that "Any updates or changes are shared between Sydney Water and TRILITY. A copy of the Macarthur DWQMP is stored in Sydney Water's DWMS (Helix)". During the audit we tested this statement and found that the version on Helix was older than the version that had been provided to us.

Below we discuss the key findings that contributed to the grade against each element of the ADWG Framework that was in the scope.

Element 1 Commitment to drinking water quality management

Drinking water quality policy

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to formulate a drinking water quality policy, endorsed by senior executive, to be implemented throughout the organisation and ensure that the policy is visible, communicated, understood and implemented by employees.

Sydney Water's Drinking Water Management Policy outlines the strategic intent relating to drinking water and the obligations of all employees and contractors. The review of the policy commenced at the end of the audit period and the policy was finalised on 21 July 2021. It is implemented through the Drinking Water Management System.

Key stakeholders with management responsibility for areas of the policy were involved in the policy review and the updated policy was communicated through the Product and Asset Leadership Group forum.

Sydney Water ensures key staff involved in the operation of drinking water schemes have the required skills by including drinking water requirements in their position descriptions (e.g. Operations Team Lead).

Element 1 of TRILITY's Drinking Water Quality Management Plan for Macarthur did not document how the policy is communicated or understood by staff. Element 8 did note new employees and subcontractors are introduced to the policy as part of the induction process.

Regulatory and formal requirements

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to identify and document all relevant regulatory and formal requirements, ensure responsibilities are understood and communicated to employees and review requirements periodically to reflect any changes.

The Sydney Water Compliance Accountability Register and Environmental External Requirements Register summarise existing regulatory and formal requirements.

The Compliance Accountability Register lists relevant legislation (Acts) that apply to Sydney Water, including Acts related to water quality. The register captures the accountabilities across Sydney Water for ensuring that measures are in place to comply with requirements. The register also lists the high-level measures (controls such as frameworks and processes) that are in place.

The register is reviewed annually or may be updated more frequently if significant changes to legislation or organisational accountabilities occur. The annual review is coordinated by the Corporate Compliance team.

Sydney Water provided the Raw Water Supply Agreement and Raw Water Supply Protocols with WaterNSW (SDIMS0054, version 2, dated 8/12/2016) as a compliance measure in the register for managing water quality risk. The Raw Water Supply Agreement sets out the commitment from WaterNSW and Sydney Water to provide safe drinking water. The Raw Water Supply protocols detail the day-to-day operation for this, which includes the BOO suppliers such as TRILITY.

The Environmental External Requirements Register (SWEMS0003.01, version 15, dated 24/7/2020) identifies external environmental requirements (compliance obligations) for which there is a reasonable expectation of Sydney Water's participation and compliance. These include instruments such as Standards/ Codes of Practice, Agreements, Guidelines, Memoranda of Understanding and Policies. The requirements in the Environmental External Requirements Register are additional supporting documentation to legislative requirements in Sydney Water's Compliance Accountability Register. There are minor currency issues between the Drinking Water Management Manual and Helix descriptions of the register.

The Environmental External Requirements Register is reviewed annually in line with the Compliance Accountability Register review, or sooner if required through identification of a new requirement or significant change. Key contacts are requested to review the requirements listed and advise of any changes to the requirements and mechanisms for implementation. An email dated 9/3/2021 requesting recipients review the register was provided as evidence. The e-mail requested recipients confirm they were the appropriate recipient, update allocated compliance measures and evaluation mechanisms and suggest other instruments for potential inclusion in the Environmental External Requirements Register.

The July 2016 Memorandum of Understanding (MoU) with NSW Health was active for 2020-21. A new MoU was negotiated with NSW Health in 2020-21 and was signed on 2 August 2021. This is now the active document in BMIS (WPIMS5015) and on the Sydney Water website under Reports and Publications - Memorandums of

Understanding. Evidence was provided of an extension letter until 30 June 2021 signed by NSW Health extending the MoU from its original expiry of 31 December 2020.

The Macarthur WFP Drinking Water Quality Management Plan (MAC-PLN-005) was missing key statutory requirements including the Sydney Water Act 1994 (NSW), Sydney Water's operating licence and the Fluoridation of Public Water Supplies Act 1957 (NSW). The plan also did not articulate how TRILITY ensured regulatory and formal responsibilities were understood and communicated to staff nor the review process for these requirements.

Engaging stakeholders

We found a shortcoming in the identification of this component, which requires Sydney Water to identify all stakeholders who could affect, or be affected by, decisions or activities of the drinking water supplier, develop appropriate mechanisms and documentation for stakeholder commitment and involvement and regularly update the list of relevant agencies.

The Drinking Water Management Manual identifies key stakeholders for water quality are NSW Health, WaterNSW, IPART and Sydney Desalination Plant Pty Ltd (SDP). The Manual notes other stakeholders are State Government, regulators, local councils, developers, customer and business advocacy groups, contractors, suppliers and end-users.

Within the DWQMS we could not identify how Sydney Water tracks specific stakeholders who may affect or impact drinking water activities. One example of these specific stakeholders are the lessees of the land above the underground drinking water reservoirs. The leases require the lessee to manage the grounds with approved chemicals.

Interaction with NSW Health and WaterNSW takes place at a strategic and operational level via quarterly, formally documented Strategic Liaison Group (SLG) and Joint Officer Group (JOG) meetings.

The Water Quality Management Contact List (D0001088) is managed through BMIS and is reviewed and updated every six months or when there is a significant restructure or changes within Sydney Water, WaterNSW, NSW Health or BOO partners.

The Macarthur WFP Drinking Water Quality Management Plan (MAC-PLN-005) does not document under this component how TRILITY meets the requirements to identify all stakeholders who could affect, or be affected by, decisions or activities of the drinking water supplier, develop appropriate mechanisms and documentation for stakeholder commitment and involvement and regularly update the list of relevant agencies.

Element 2 Assessment of the drinking water supply system

Apart from the ongoing shortcoming identified last year (Recommendation 2020-06) we found Sydney Water's DWQMS contains current procedures and processes that meet the ADWG requirements to conduct water supply system analysis, assess water quality data, identify hazards and conduct risk assessments, and undertake periodic reviews.

The DWQMP documents two levels of water quality risk assessment:

1. The catchment-to-customer risk review assesses the overarching and strategic level of risks applying to the Sydney Water Drinking Water Quality Management System. The Risk review: Catchment-to-customer drinking water quality procedure (BMIS0249, version 2, 23/3/2018) sets out requirements for the review. The review entails a major review performed once per five years, involving comprehensive analysis of data and frequent minor, 'high-level' reviews performed monthly to quarterly to address emerging or changing risks.
2. Operational water quality risk assessments assess the scheme-specific and operational-level water quality risks relevant to a drinking water supply scheme. The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water (D0000799, version 4, dated 30/3/2021) sets out requirements for the assessments. Assessments for each drinking water supply scheme are performed annually.

The documented requirements for these two procedures meet ADWG components and actions as shown in Table 2-8.

Table 2-8. Comparison of ADWG requirements with risk assessment procedures

ADWG Component	ADWG Action	Catchment to Customer Procedure	Operational water quality risk assessment
Water supply system analysis	Assemble a team with appropriate knowledge and expertise	Section 4.2.3 – form a working group. WaterNSW and NSW Health must be invited and 5.2.1 Establish standing working group. Section 4.3.1 Identify reviewers	2. Scope states that the workshop should include operations and planning staff from Sydney Water and BOO teams, relevant risk owners, control owners and risk specialists and NSW health. Where relevant WaterNSW and Sydney desal may be invited
	Construct a flow diagram of the water supply system from catchment to consumer	Section 4.2.5 High level flow diagram to be prepared	Section 4.1 documents the requirement for a detailed process flow diagram
	Assemble pertinent information and document key characteristics of the water supply system to be considered	4.2.1 and 4.2.2 Collate risk records and identify focus areas	4.1 Risk assessment briefing paper or similar
	Periodically review the water supply system analysis	Section 3 – major review every 5 years. Minor reviews every 1-3 months	Section 2 – annual review
Assessment of water quality data	Assemble historical data from source waters, treatment plants and finished water supplied to consumers (over time and following specific events)	Section 4.2.6 - collate water quality data inputs	Section 4.1 (2) raw and treated quality for WFP and networks for 12 months and long-term (5 and 10 years), with charts and trends to show performance
	List and examine exceedances	Section 4.2.6 - collate water quality data inputs	Section 4.1 (4) document current issues, emerging issues, critical assets /

ADWG Component	ADWG Action	Catchment to Customer Procedure	Operational water quality risk assessment
			frequent failure assets, incident and notification to NSW Health in previous 12 months
	Assess data using tools such as control charts and trends analysis to identify trends and potential problems	Section 4.2.6 - collate water quality data inputs	Section 4.1 raw and treated quality for WFP and networks for 12 months and long-term (5 and 10 years), with charts and trends to show performance
Hazard identification and risk assessment	Define the approach and methodology to be used for hazard identification and risk assessment	Section 4.4 Workshop documents high level approach but lacks details on the approach. There is a requirement to agree risk assessment criteria (Section 4.2.7)	Section 4.2 (4) documents the risk methodology and matrix
	Identify and document hazards, sources and hazardous events for each component of the water supply system		Section 4.3 Risk assessment and Section 5 Risk Framework working group outcomes and risk tool
	Estimate the level of risk for each identified hazard or hazardous event		
	Evaluate the major sources of uncertainty associated with each hazard and hazardous event and consider actions to reduce uncertainty		
	Determine significant risks and document priorities for risk management	Section 4.52 update improvement register and Section 4.5.3 update risk management records	Section 4.9 documents that improvement actions are to be summarised in the risk report as a Consolidation Action Plan. The improvement actions will be registered in the drinking water improvement plan, interface (WFP) registers or network registers by a team of subject matter experts
	Periodically review and update the hazard identification and risk assessment to incorporate any changes	5 yearly major review and frequent (monthly to quarterly) high level reviews	Annual review process

NSW Health raised in their stakeholder submission that risk assessments with the potential to impact public health were conducted without inviting a NSW Health representative. These risk assessments did not fall into either of the above categories. This gap is discussed in Clause 5.5.

The Macarthur WFP Drinking Water Quality Management Plan does not have any discussion on the team involved in assessing the drinking water system.

Recommendation 2020-06 required Sydney Water to review the Corporate Risk Matrix to rectify inconsistencies between Public Health and Injury / Illness consequence descriptors, including liaison with NSW Health. Sydney Water has progressed but not resolved this recommendation to the satisfaction of NSW Health.

Element 3 Preventive measures for drinking water quality management

Preventive measures and multiple barriers

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to identify existing preventive measures from catchment to consumer for each significant hazard or hazardous event and estimate the residual risk, evaluate alternative or additional preventive measures where improvement is required and document the preventive measures and strategies into a plan addressing each significant risk.

The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water (D0000799) identifies the requirements to review controls and Sydney Water has processes to capture preventive measures as "Key Controls" in the operational risk registers. The control points are also identified in the Drinking Water Product Specification (IMS0152.01, version 5, 19/3/2021).

Critical control points

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to assess preventive measures from catchment to consumer to identify critical control points, establish mechanisms for operational control and document the critical control points, critical limits and target criteria.

Sydney Water has developed a Drinking Water Product Specification (IMS0152.01) which outlines how critical control points (CCPs) were identified and documents the CCPs, the target criteria and the critical limit. Action limits and critical limits are incorporated as online alarms in SCADA/IICATS.

Sydney Water advised a new CCP (pressure decay rate) was added at Nepean WFP for the Nepean package membrane plant. These changes were documented in the Drinking Water Product Specifications, which was updated in the audit period.

North Richmond WFP Process Decision Making and Abnormal Water Quality WI (DOC0350) also documents the CCPs and operator's action for exceeding the target criteria and critical limits.

Macarthur WFP's CCP tables are included in the process flow diagram and risk assessment report. The CCP table in the risk assessment report includes appropriate high level response actions.

Element 4 Operational procedures and process control

Operational procedures

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to identify procedures required for processes and activities from catchment to consumer and document all procedures and compile into an operations manual.

The Drinking Water Management Manual and Helix notes that operational procedures are documented and managed through the IMS. We were provided with a list of procedures for North Richmond WFP (North Richmond WFP list of procedures.JPG). From the list provided all procedures were current. We also requested a list of documents in the drinking water management system that were past their review date on the 21/2/2021. Over 35 work instructions were out of date by an average of 3 ½ months.

Sydney Water has operations manuals for its plants managed and accessible through BMIS. TRILITY manages their procedures through Lotus Notes. The Lotus Notes database was demonstrated during the virtual site visit

We observed that the linkage between Helix and the operation documentation was inconsistent. For example, there were:

- network procedures listed under section 04.01.01 but no WFP procedures
- calibration procedures for Nepean and Warragamba WFP listed under 04.04.01, but no procedures for other plants (e.g. Cascades, Orchard Hills)
- generic unit process guides for filtration (WTHQ5022) and coagulation and flocculation (WTHQ5024) but not for other processes such as chlorination.

The introduction of Helix is a step change improvement for Sydney Water in improving the line of sight from the operating licence obligations to on the ground activities. Ensuring consistency in application is important and so we have captured this shortcoming in Recommendation 4.1.1-1.

We found that procedures and processes to ensure maintain water quality during pipe repair procedures were not explicit. The field staff interviewed could not easily point to the water quality and pipe hygiene requirements (see Section 2). There was an understanding that pipes are flushed for 15 minutes but the basis for this (and reasons for extending a pipe flush) was not articulated even though a pipe flush table was included in in the training materials. (Drinking WQ awareness training Package – Civil.pdf).

There is an opportunity for improvement (OFI 4.1.1) for Sydney Water to review its processes and communication for pipe hygiene. We suggest Sydney Water conducts a gap analysis of its pipe repair approach with the pipe repair and renewals control framework (WaterRA Project 1091, 2017) and considers Unity Water's 5C's program to increase water hygiene awareness:

- Clean pipes (use a mat, wipe and spray)
- Clearance (a gap with positive pressure)
- Chlorination (spray pipes, fittings, tools and boots)

- Cleanliness (work and storage areas, wash hands)
- Clothing (sewer to water jobs? Clean or change).

Training and audits of third-party contractors in pipe hygiene should also be considered. Implementation of this OFI should reduce dirty water incidents such as that noted in 4.1.3.

TRILITY has documented Work Instructions on Lotus Notes. This was demonstrated during the virtual site visit. Two thirds of the process work instructions we saw were due for review dating back to August 2020. TRILITY advised that these reviews were delayed due to the plant upgrade and COVID-19. They demonstrated the use of the document management system to track the review process. This was demonstrated for the Filtered Water Turbidity Operating Protocols.

Sydney Water has demonstrated adequate operational procedures relating to fluoridation for the Macarthur and North Richmond WFPs. For more detail see clause 4.3.1.

Operational monitoring

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to develop monitoring protocols for operational performance of the water supply system, including the selection of operational parameters and criteria, and the routine analysis of results and document monitoring protocols into an operational monitoring plan.

Sydney Water primarily uses real-time telemetry of water quality and quantity measurements and alarms (IICATS and SCADA) to identify, manage and control excursions. Sydney Water has change management processes for operational system changes (HOG5213) and changes to alarm protocols (HOG5211). This monitoring is supported by operational monitoring undertaken by Production and supported by Sydney Water's NATA accredited laboratory. The operational system performance monitoring protocols are documented in the Drinking Water Quality Operational Monitoring Plan 2020-2021 (BMIS0045). The plan included raw, treated, sampling parameters, schedules, locations, frequencies and guideline limits. High level process barrier monitoring is documented in the Drinking Water Product Specification (IMS0152.01).

We requested information on the impacts of COVID-19 to the monitoring program. Sydney Water provided a spreadsheet that documented the compliance and operational monitoring requirements with 5 different capacity decision points (100%, 65%, 50%, 25%, 0%). Sydney Water's approach to managing monitoring requirements, with a focus on compliance monitoring and higher risk parameters as analysis capacity reduces is appropriate.

Macarthur WFP has a daily water quality operational record sheet that collects appropriate water quality information.

The fluoridation monitoring procedures were adequate, both the TRILITY and Sydney Water procedures provided covered the necessary content appropriately.

There is text in Helix in the operational monitoring section (04.02) that is identical to the text in hazard identification and risk assessment (02.03). The text in section 04.02 should be updated as part of Recommendation 4.1.1-1.

Corrective action

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to establish and document procedures for corrective action to control excursions in operational parameters and establish rapid communication systems to deal with unexpected events apart from a shortcoming in references to corrective actions in the Macarthur WFP Drinking Water Quality Management Plan.

This component requires that: "Procedures should be developed for immediate corrective action to re-establish process control following failure to meet target criteria or critical limits. The procedures should include instructions on required adjustments, process control changes and additional monitoring. Responsibilities and authorities, including communication and notification requirements, should be clearly defined."

There is a gap in the Macarthur Drinking Water Quality Management Plan for this component. The Plan does not refer to any supporting procedures. We have made a recommendation for the Plan to be updated to capture the requirements of this component (Recommendation 4.1.1-2).

Sydney Water has a range of procedures and processes to control excursions. Primarily Sydney Water uses real-time telemetry of water quality and quantity measurements and alarms (IICATS and SCADA) to identify, manage and control excursions. Sydney Water has change management processes for operational system changes (HOG5213) and changes to alarm protocols (HOG5211).

Water quality exceptions are recorded in daily action reports (LIMNOS Actions database) and notable drinking water incidents are recorded within the Sydney Water Incident Reporting and Learning (SWIRL) tool.

Supporting procedures are:

- Drinking Water Quality Event Management procedure (WPIMS5228, version 19, 15/6/2021) provides guidance for staff involved in the operation of the drinking water supply system in identifying and responding to water quality events that are outside those normally expected. This includes communication requirements and references the Water Quality Management Contact List (D0001088)
- Triggers, Notifications and Actions for Adverse Water Quality Results procedure (D0001676, version 1, 23/4/2020) outlines the process and responsibilities involved in identifying and reporting exceptions based on analytical results for drinking water
- Managing Customer Water Quality Complaints SOP (WOQ5162) – provides guidelines for Networks personnel for responding to water quality customer complaints including complaints regarding recycled water.

MAC-EAP-014 Fluoride overdosing event was provided as evidence of the Macarthur WFP procedure to control fluoride overdosing events. Staff were able to explain how the

site specific fluoride overdosing plan interacted with the fluoride overdose response in the Drinking Water Quality Event Management procedure (Section 9, p.15).

Equipment capability and maintenance

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to ensure that equipment performs adequately and provides sufficient flexibility and process control and establish a program for regular inspection and maintenance of all equipment, including monitoring equipment.

Sydney Water uses its MAXIMO enterprise asset management system to help set work orders to manage planned and unplanned maintenance of assets as well as for long-term strategic asset management and planning to support decision making for the replacement and acquisition of critical assets. MAXIMO generates monthly maintenance work orders, which are actioned by Sydney Water's maintenance service provider. The fluoride analyser maintenance schedule in the Work Instruction for maintenance of ProMinent DACa Online Fluoride Analyser (WTNR5109.01, version 3, 10/8/2020) was sighted and found to be satisfactory. Asset Management is considered further under Clause 5.5.

Sydney Water has a procedure (WT5230 - Management of Testing, Calibration & Maintenance of On-line and Laboratory WQ Monitoring Equipment) that guides production officers when implementing new or reviewing existing measurement systems, testing equipment and methods or work instructions dealing with drinking water. The procedure sets out that work instructions will be developed for each test method and instrument. The work instructions are common across the WFPs and distribution systems and prescribe the minimum testing, maintenance and calibration frequencies.

The frequency of testing and calibration and the acceptance criteria are documented in site specific Mater Equipment Calibration Lists. The North Richmond WFP master list was provided as evidence and met the requirements documented in procedure WT5230.

Materials and chemicals

Sydney Water has provided sufficient evidence to demonstrate it has generally met the ADWG requirements to ensure that only approved materials and chemicals are used and establish documented procedures for evaluating chemicals, materials and suppliers. There were currency issues with the chemical specification.

Sydney Water has developed a procedure that lists all the approved chemicals in treatment (D0000643). The procedure lists the chemical supplier and chemical purpose. It summarises the technical specifications for the chemicals. Changes to chemical suppliers are approved through change management processes (IMS0038.04).

Sydney Water also has specifications (BMIS0209 and CPDMS0023) for approved materials for chemical, mechanical and civil works which is followed in design, construction and commissioning of assets.

There are specifications for chemicals:

- Calcium hypochlorite specification for drinking water treatment (D0000154)
- Caustic soda specification for drinking water treatment (D0000158)
- Ferric chloride specification for drinking water treatment (D0000159)
- Hydrofluorosilicic acid specification for drinking water treatment (D0000162)
- Hydrated lime specification for drinking water treatment (D0000163)
- Liquefied chlorine gas specification for drinking water treatment (D0000165)
- Potassium permanganate specification for drinking water treatment (D0000167)
- Sodium hypochlorite specification for drinking water treatment (D0000168).

These specifications were due for review on 30/6/2020 and had not been updated by 21/2/2021.

There are also procedures for chemical delivery (D0001375) and chemical quality assurance (WT5232).

The TRILITY Sodium SilicoFluoride Specification Sheet, ordering and loading procedures for the Macarthur WFP were sighted and adequately demonstrate the use of approved chemicals in fluoridation.

Element 5 Verification of drinking water quality

Drinking water quality monitoring

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to determine the characteristics to be monitored in the distribution system and in water as supplied to the consumer, establish and document a sampling plan for each characteristic, including the location and frequency of sampling and ensure monitoring data are representative and reliable.

Monitoring protocols for verification system performance are documented into a Monitoring Plan. The Monitoring Plan – Annual Drinking Water Quality Monitoring Plan 2020-2021 (BMIS0045) was provided as evidence of the currency of the monitoring plan. The plan includes sampling parameters, schedules, locations, frequencies and guideline limits.

Consumer satisfaction

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to establish a consumer complaint and response program, including appropriate training of employees.

The Sydney Water Customer Hub is responsible for taking all fault related customer calls including water quality. Water quality complaints are addressed via Managing Water Quality Customer Complaints procedure (D00001661, version 1, 17/9/2019). Health related water quality complaints are followed up within 1 hour. All other water quality complaints are followed up within 4 hours.

Area Water Quality Scientists are responsible for managing water quality complaints. Area Water Quality Scientists are developed through a specific program that involves practical hands-on training and a competency program run alongside experienced

Water Quality Scientists documented in the procedure Development Program for Water Quality Scientist (D0001673, version 3, February 2021).

Short-term evaluation of results

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to establish procedures for the daily review of drinking water quality monitoring data and consumer satisfaction and develop reporting mechanisms internally, and externally, where required.

Non-conformances in relation to water quality grab sampling data are reported through:

1. daily exception reports – the work instruction for these reports is included in the Triggers, Notification & Actions for Adverse Water Quality Results (D0001676)
2. daily Labware notification set up though a Product Specification Module- Limits are set on specific analytes
3. direct phone calls followed up with an email from Analytical services.

Process monitoring is documented in the On Line Monitoring & Control of Assets via IICATS Integrated Management System (HOG5214, version 5).

The process to review consumer satisfaction is documented in the Managing Water Quality Complaints Procedure.

The Drinking Water Quality Event Management Procedure (WPIMS5228) outlines internal and external reporting mechanisms for non-conformances.

The water alert system provides timely advice to water quality stakeholders where a high number of discoloured water complaints are received in a reservoir zone in a short period. The alert assists network operational staff in effectively responding to customer complaints and the identification of the cause.

Managing Water Quality Customer Complaints Procedure (D00001661) documents that automated complaint alerts are generated and sent via SMS/email to the Water Quality Scientist or Standby Officer (after hours) when:

- 4 discoloured water customer complaints within 1 hour per zone, generated from Maximo
- 10 discoloured water customer complaints over a 24-hour period per zone, generated from Maximo
- 5 customer complaints within 90 minutes across the Sydney Water Network, generated from Customer Relationship Management (CRM).

The Update of public Daily Drinking Water Quality Report work instruction (D0000097, Version 3, January 2020) contains a workflow or the identification and notification of CCP exceptions and high secondary chlorination results. There are steps to verify if the results are real, according to standard plant procedures and if the results require reporting to NSW Health. This work instructions supports the requirement to establish rapid communication systems.

The work instruction did not include the CCP for the Nepean Filtration Plant at Nepean. While this CCP was added to the Drinking Water Product Specification on 23/4/2020 Sydney Water advised that the package plant had not yet been fully commissioned and had not supplied drinking water to the system in 20-21. Sydney Water advised the daily drinking water reporting process is being reviewed and work instructions relating to the process will be subsequently updated.

Corrective action

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to establish and document procedures for corrective action in response to non-conformance or consumer feedback and establish rapid communication systems to deal with unexpected events.

The procedures for corrective actions in response to customer feedback is documented in the Managing Water Quality Complaints Procedure. Other documented procedures for corrective action were discussed in Element 4.

Element 6 Management of incidents and emergencies

Communication

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to define communication protocols with the involvement of relevant agencies and prepare a contact list of key people, agencies and businesses, and develop a public and media communications strategy.

The Drinking Water Quality Event Management procedure (WPIMS5228) outlines internal and external reporting mechanisms for non-conformances. This procedure is supported by Water Quality Management Contact List (D0001088).

The Water Quality Incident Joint communication protocols outline the incident communication principals and joint communications approval process.

Sydney Water used SWIRL (Sydney Water Incident Reporting and Learnings) to maintain the incident records including notification to NSW Health, additional water quality sampling data and actions.

Incident and emergency response protocols

Sydney Water has provided sufficient evidence to demonstrate it has procedures that when implemented met the ADWG requirements to:

- define potential incidents and emergencies and document procedures and response plans with the involvement of relevant agencies
- train employees and regularly test emergency response plans
- investigate any incidents or emergencies and revise protocols as necessary.

The Drinking Water Quality Event Management procedure (WPIMS5228) is the primary document that defines potential incidents and emergencies and their management. Appendix 1 tabulates the event, potential water quality impact, responsible officer, event response, event reporting/ notification and incident trigger.

Supporting documents include:

- Triggers, Notification & Actions for Adverse Water Quality Results (D0001676).
- critical control point tables
- site specific documentation such as North Richmond WFP Process Decision Making and Abnormal Water Quality WI.

More broadly Sydney Water has other business resilience procedures to identify and manage potential incidents:

- Incident Management Procedure (D0000506, version 2, 22/1/2019)
- Emergency Management Procedure (D0000507)
- Incident and Investigation and Lessons Learned work instruction (SDIMS0041)
- Debrief (D0000512).

Sydney Water has adopted the standard industry approach to incident and emergency management of:

1. Prevention
2. Preparedness
3. Response
4. Recovery.

This approach is outlined in both the incident and emergency management procedures (D0000506 and D0000507).

The Drinking Water Management Manual records only the Incident and Investigation and Lessons Learned work instruction as the mechanism to review incidents and not the Debrief. In practice Sydney Water undertook debriefs following incidents but the Incident and Investigation and Lessons Learned investigations were not always conducted. The Drinking Water Management Manual records should be updated to include debriefs as a type of incident investigation. We do not consider the reference to the Incident and Investigation and Lessons Learned investigations should be removed as identifying the root cause of incidents is important to preventing a recurrence.

There is an out-of-date reference in the text in Helix (section 06.01.02) to EM0007 – Duty Manager's Guide. We requested this document and were advised that its contents have been integrated into the Emergency Management and Incident Management Procedures.

Element 8 Community involvement and awareness

Community consultation

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to assess requirements for effective community involvement and develop a comprehensive strategy for community consultation apart from shortcomings in the currency of the Drinking Water Management Manual and Helix documentation.

The Drinking Water Management Manual documents community engagement through the Customer Council and the Business Customer Forum. In the questionnaire Sydney Water advised that the Business Customer Forum no longer runs. Sydney Water advised that it engages with major business customers that hold industrial trade waste consents

through one-on-one relationships with allocated Business Customer Representatives. It holds planned Relationship Management Meetings with those customers. These meetings are not documented as a consultation method in the Drinking Water Management Manual.

The text in Helix under 08.02 Communication is a duplicate of ADWG – 08.01 – Community Consultation. The contents of these sections focused on customer satisfaction rather than community engagement, while section 5.02 Consumer Satisfaction included information on Sydney Water's two-way engagement program.

The Community Consultation section of the Drinking Water Management Manual and Helix should be updated to reflect the activities that Sydney Water is undertaking and remove those that are no longer current. This update is captured as part of Recommendation 4.1.1.

Sydney Water has guidelines for community and stakeholder engagement (Guidelines for community and stakeholder engagement.pdf). These guidelines include the benefits of engagement, level of engagement communication and stakeholder planning for more deliberative forms of engagement including monitoring and feedback. The guidelines are consistent with practices supported by the International Association of Public Participation.

Communication

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to develop an active two-way communication program to inform consumers and promote awareness of drinking water quality issues. The line of sight between the requirements of the Drinking Water Management Manual and the implemented programs is unclear and should be strengthened (Recommendation 4.1.1).

In the questionnaire, Sydney Water advised that their Customer Direction and Experience (CDE) team undertake programs to:

- understand customers and their experiences with Sydney Water
- communicate these insights as actionable recommendations to relevant audiences across the organisation
- validate insights by working collaboratively to design and test solutions
- support the business to implement the necessary changes and monitor the outcomes.

The key activities include the Consumer Sentiment Monitor, the Brand Tracker, and the Service Fault tracker. These studies run continuously but results are reported quarterly, or monthly for the Service Fault tracker. A Stakeholder Perceptions Survey is conducted annually to provide insight into Sydney Water's relationship with external stakeholders. The Brand Tracker and Community Sentiment Monitor both have a water quality focus.

The Brand Tracker has specific water quality considerations so meets the requirements of this component. The Community Sentiment Monitor asks direct questions of the community about their perceptions of tap water safety, and whether they boil or filter their water. Sydney Water uses the response to these questions to gauge the level of

customer trust and acceptance of drinking water and enable Sydney Water to understand what level of engagement is needed on drinking water issues.

In 2020-21 Sydney Water continued to work on engagement with Culturally and Linguistically Diverse (CALD) communities to build trust and communicate that Sydney's drinking water is safe to drink.

A Communications and Engagement Plan - West Region Delivery team (Communications and Engagement Plan - West Region.pdf) identified stakeholder groups and customer types. Water quality was not specifically identified within the plan. There is an opportunity for Sydney Water to be clearer in its community engagement documentation regarding water quality improvement programs (OFI 4.1.1-2).

Element 9 Research and development

Investigative studies and research monitoring

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to establish programs to increase understanding of the water supply system and use information to improve management of the water supply system.

Sydney Water provided the research and innovation strategy that was in place for the audit period (Research and Innovation Strategy - Towards 2020 and beyond). Of relevance to this clause was the program to "Delivery safe and reliable water". Sydney Water had identified the following projects as part of that program:

- investigating the impact of climate change on raw water quality specifically the nature of natural organic matter, both in raw water and the subsequent impact on water treatment processes
- researching the impacts of disinfection to optimise disinfection processes and managing an effective disinfection residual ensuring a balance between customer aesthetic and public health requirements
- understanding new and emerging contaminants of concern and the potential risk to customers from these contaminants
- investigating automation and control to optimise water treatment processes and distribution system management
- progressing new techniques and tools e.g. microbial source tracking to enable the identification of the source of pathogen contamination events).

We questioned how the BOO plants were incorporated into the research strategy. Sydney Water responded that there are three-year plans in place. The BOO program aims to improve the efficiency of operations at the BOO plants. The BOO research is governed by a separate committee composed of a Sydney Water representative and BOO operator representative. We were provided with a TRILITY and Sydney Water Research and Development Roadmap (BOO R&D Roadmaps TRILITY and Sydney Water.pptx)

Sydney Water stated in the questionnaire that their new Innovation, Research & Deployment Plan is in development and will be available during 2021. This Plan is closely aligned to Sydney Water's Corporate Strategy and outlines their key research priorities across the next ten years and beyond.

Validation of processes

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to validate processes and procedures to ensure that they are effective in controlling hazards and revalidate processes periodically or when variations in conditions occur.

While the Drinking Water Management Manual provides limited guidance on validation, the text in Helix provides clarity on Sydney Water's approach to validation. Helix documents:

"Sydney Water evaluates scientific and technical information to validate processes. Further investigations including testing is (sic) used to validate system specific operational procedures, critical limits and target criteria. Any new processes are validated through a number of potential avenues including using benchtop, pilot-scale or full-scale experimental studies to confirm that the process and operational criteria produce the required results under the conditions specific to the individual water supply system."

Helix documented that Sydney Water performs ongoing validation of filter performance and primary disinfection. The Drinking Water Product Specification has filter effluent turbidity criteria to meet the removals documented in Drinking Water Source Assessment and Treatment Requirements: Manual for the Application of Health-based Treatment Targets (WSAA Manual). The application of the WSAA Manual is an acceptable approach.

Sydney Water performs ongoing validation of primary disinfection through analysis of Ct performance. The Drinking Water Product Specification sets criteria for primary disinfection performance.

Design of equipment

Sydney Water has provided sufficient evidence to demonstrate it has met the ADWG requirements to validate the selection and design of new equipment and infrastructure to ensure continuing reliability.

The Drinking Water Management Manual documents that pilots and options analysis are used for an evidence-based design of equipment and infrastructure and that equipment is selected to meet a Function Design Specification.

Helix states: "To ensure that new infrastructure is validated and achieves the required performance, operational performance and procedures have been developed and implemented. These have become business as usual activities and have been integrated into various parts of the business. Examples of these types of procedures include, disinfection processes for new water mains, main laying procedures, certifying water quality when commissioning/returning reservoirs to service, dual media filter commissioning procedure etc."

There were also links to the Mechanical Technical Specification (BMIS0209) and the Civil Works Technical Specification (CPDMS0023).

Element 10 Documentation and reporting

Management of documentation and records

Sydney Water has provided evidence to demonstrate it has met the ADWG requirements to:

- document information pertinent to all aspects of drinking water quality management, develop a document control system to ensure current versions are in use
- establish a records management system and ensure that employees are trained to fill out records
- periodically review documentation and revise as necessary.

We were unable to establish accountabilities and schedules for the review of the individual sections of Helix and the Drinking Water Management Manual, which we consider a shortcoming. There are also shortcomings with document currency, noted throughout this clause (e.g. work instructions discussed in element 4). Recommendation 4.1.1-1 is made to address this shortcoming.

Sydney Water has a quality management system certified to ISO9001:2015. It uses BMIS to manage the review of documents. The system was demonstrated through the audit interviews. As part of their commitment to continuous improvement, Sydney Water is transitioning to a single management system 1MS (One Management System (1MS): High-Level Program Implementation Plan (Version 5) discussed in Clause 5.5).

A key finding was inaccuracies in the Drinking Water Management Manual and text in Helix. During the audit interviews we were advised that the subject matter experts were responsible for keeping the information up to date. We were unable to establish accountabilities and schedules for the review of the individual sections of Helix.

Implementation of Helix demonstrates Sydney Water's commitment to continuous improvement. There is however a future risk that these inaccuracies lead to a non-compliance with the operating licence (Recommendation 4.1.1-1).

Reporting

Sydney Water has provided sufficient evidence to demonstrate it established procedures for effective internal and external reporting, although we noted different reporting activities were documented in the Drinking Water Management Manual and Helix (10.2).

Effective internal and external reporting

Table 10-1 in the Drinking Water Management Manual (BMIS0213) summarises the key compliance (i.e. external) reporting activities for drinking water. Sydney Water produces:

- monthly fluoride monitoring reports to NSW Health
- quarterly system-specific drinking water quality monitoring reports for the public
- quarterly drinking water monitoring reports for NSW Health
- annual Compliance and Performance Report (water quality) for IPART and NSW Health
- annual Water Conservation report for IPART.

We were unable to establish the linkages between the reporting requirements documented in the Drinking Water Management Manual, the text in Helix and the Key Activities in Helix. For example, Section 10.2 of the Drinking Water Management Manual Table 10-1 (listed above) summarises the compliance reporting activities, but these activities are not listed in Section 10.02.02 in Helix.

Helix (Section 10.02) provides the following examples of internal reporting processes:

1. Daily nitrogen reports to manage disinfection in chloraminated systems
2. Twice daily exception reporting of lab results
3. Production of monthly control charts
4. Ad hoc BI reports are generated, as requested
5. Monthly water filtration plant report.
6. Monthly Table Fluoride exception commentary reports
7. Twice weekly and monthly customer complaint reports
8. Exception reporting generated through automated customer complaint alarms
9. Twice daily dirty water reports
10. Monthly Performance (business area) reports
11. Automated reporting of WQ exceptions of online instruments through IICATS/SCADA
12. Six Monthly Folio of Progress reporting.

Annual reports

Sydney Water prepares a Compliance and Performance Report (Water Quality) – referenced in the Drinking Water Management Manual which is required by the IPART reporting manual (see Clause 10.2.2 for details of the requirements). Sydney Water also details compliance (12 months) against microbial, health-related chemical and aesthetic criteria defined under the ADWG in the fourth water quality report to NSW Health although we could not find an explicit reference to annual review of data in the DWQMS.

Sydney Water publishes quarterly public drinking water quality monitoring reports by distribution system on their website. While the DWQMS does not explicitly document the preparation of an annual report for customers Sydney Water advised that the fourth quarterly report provided to customers each year also functions as an annual report relevant to their delivery network. When we reviewed the first quarter and fourth quarter reports, the content was the same. Rolling annual averages are included in both reports.

The ADWG (3.10.2) requires: “An annual report should be produced and made available to consumers, regulatory authorities and stakeholders. The annual report should:

- summarise drinking water quality performance over the preceding year against numerical guideline values, regulatory requirements or agreed levels of service, and identify water quality trends and problems;
- summarise any system failures and the action taken to resolve them;
- specify to whom the drinking water supplier is accountable, statutory or legislative requirements, and minimum reporting requirements;

- indicate whether monitoring was carried out in accordance with the principles of risk management set out in the Australian Drinking Water Guidelines, standards set by the regulator and any requirements contained in agreed levels of service."

The quarterly public reports summarise drinking water quality performance over the preceding year against numerical guideline values. The reports contain references to the ADWG and the number of verification samples taken. The reports do not explicitly reference the risk management principles of the ADWG but they do discuss the multi-barrier approach. The reports do not contain information on system failures nor customer notifications of water quality issues.

We noted in our audit last year that there was no line-of-sight between the DWQMS and the parameters to be reported in the quarterly water quality monitoring reports. This lack of clarity makes verifying the implementation of the management system more difficult and poses a compliance risk for Sydney Water.

The IPART Reporting Manual requires:

"In line with clause 4.1.3 of the Licence, Sydney Water must ensure that the DWQMS is implemented and that all relevant activities are carried out to the satisfaction of NSW Health. This includes the characteristics that the DWQMS specifies for inclusion in the Quarterly Water Quality Monitoring Report."

An opportunity for improvement (OFI 4.1.1-3) is suggested to explicitly document the characteristics that the DWQMS specifies for inclusion in the Public Quarterly Water Quality Monitoring Report. This could be a reference to the specific monitoring plan.

Sydney Water provided procedures for Preparing the Annual DWMS & RWMS Compliance Report for IPART and a work instruction for preparing the monthly fluoride report to NSW Health.

Recommendation

Recommendation 4.1.1-1: We recommend that by 30 June 2022 Sydney Water establish processes, accountabilities and schedules for the review of the DWQMP including:

- descriptive text in Helix
- accurate links within Helix
- updating of the Drinking Water Management Manual.

The review frequency should reflect the frequency with which each aspect changes. Processes to ensure the reviews are conducted must be established.

Sydney Water must prioritise the review aspects noted in this audit report including Element 8 and the documentation of how Sydney Water meets its obligations to prepare an annual report to customers and stakeholders (element 10) so the DWQMP accurately reflects Sydney Water's practices.

We recommend that by 30 June 2023 Sydney Water ensure that the water quality management system and supporting procedures are current and do not rely solely on the specified review period but also consider non time based triggers.

Recommendation 4.1.1-2: We recommend that by 30 June 2022 the Macarthur Drinking Water Quality Management Plan is updated to address all the relevant actions in the

Framework for drinking water quality management. There is also further opportunity for improvement to document the ADWG actions that are only addressed by Sydney Water's DWQMS.

Opportunities for improvement

OFI 4.1.1-1: Review processes and communication for pipe hygiene. We suggest Sydney Water conducts a gap analysis of its pipe repair approach with the pipe repair and renewals control framework (WaterRA Project 1091, 2017) and considers Unity Water's 5C's program to increase water hygiene awareness. Training and audits of third-party contractors should also be considered.

OFI 4.1.1-2: When developing community engagement plans, articulate water quality improvements outcomes that may be achieved where relevant.

OFI 4.1.1-3: Explicitly document in the DWQMS the characteristics that the DWQMS specifies for inclusion in the Quarterly Water Quality Monitoring Report.

Clause 4.1.3

Table 2-9. Clause 4.1.3 compliance grade

Subclause	Requirement	Compliance grade
4.1.3	Sydney Water must ensure that the Drinking Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Drinking Water Quality Management System and to the satisfaction of NSW Health. [Note: Sydney Water is to apply the Drinking Water Quality Management System to the Drinking Water system under its control, having regard to the entire Drinking Water supply system – from the water catchment to the Consumer.]	Non-compliant (non-material)

Risk	Target for full compliance
If the Water Quality Management System is not fully implemented, there is a high risk that Sydney Water may not be able to effectively manage risks to water quality and protect public health.	Evidence that the Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Water Quality Management System. Evidence to show that NSW Health is satisfied with the Drinking Water Quality Management System and its implementation.

Summary of reasons for grade

The 500 ML Potts Hill Reservoir is a strategic asset for water balancing within Sydney Water's network, supplying over 2 million customers. It also provides contingency for other assets, and is thus critical for managing water quality across the system. The reservoirs are covered by a membrane roof. Since at least 2019, Sydney Water has been aware that the Potts Hill reservoir roof is reaching the end of its life. The Potts Hill reservoir roof is an important component of the multi-barrier approach to water safety.

As part of the audit process we sought to understand how Sydney Water had implemented its DWQMS to identify and manage water quality risks associated with the degradation of the reservoir roof. Sydney Water's DWQMS is supported by a broad range of asset management and business resiliency processes. We were unable to establish that these processes had been fully implemented to identify and manage the risks associated with the membrane roof failure. The need for a mitigation plan had been documented by December 2020 yet one was not developed. The risk of failure materialised with tears to the cover sustained during the extreme wet weather event in March 2021.

Low levels of E. coli were detected in April and May - a sign of potential contamination. As water is rechlorinated after this point, chlorine-sensitive pathogens should have been inactivated prior to the customers tap.

The risk assessment process (element 2), equipment capability and maintenance (element 4) and incident and emergency response processes (element 6) of the drinking water management system were not fully implemented. The absence of a plan to manage the degradation of this asset (and potential water quality impacts) is a non-conformance. There is no evidence that drinking water quality at the customers taps was adversely impacted so we consider this to be non-material in the audit period.

This clause is graded Non-compliant (non-material).

We also identified shortcomings for this clause that include:

- Failure to consistently implement the requirements of IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water (D0000799). (We will refer to this SOP as the Operational Risk Assessment Workshop SOP).
- The flow diagram prepared for the Macarthur risk assessment did not include a recycle stream. The water quality risks from this stream were not identified in the risk assessment.
- Mistakes in chemical testing record.
- The investigation into the Macarthur WFP extreme wet weather event was not completed in the timeframe required by the work instruction.
- An incident investigation has not been conducted for the Potts Hill membrane failure.

We identified further issues with equipment capability and maintenance but did not additionally examine these to form an opinion on whether they were shortcomings or deficiencies in the implementation of their DWQMS.

Discussion and notes

The audit scope was for Elements 1 to 6 and 8 to 10 of the Framework.

During the audit, we focused on implementation of the DWQMS for Macarthur and North Richmond WFPs, as well as Potts Hill Reservoir and reactive pipe maintenance.

As implementation issues related to the Potts Hill Reservoir membrane roof extended across multiple elements (1, 2, 3, 6), we have discussed this below prior to reporting on the element by element findings.

Pott Hill Reservoir

We noted deficiencies and shortcoming with the implementation of the DWQMS in relation to the degradation and subsequent tear to the Potts Hill Reservoir membrane roof.

The reservoirs are covered by a membrane roof. Since at least 2019 Sydney Water has been aware that the Potts Hill reservoir roof is reaching the end of its life. In 2019 Fabtech were engaged to repair the membrane cover of Potts Hill Reservoir. Fabtech found the cover had insufficient strength making it unsafe to walk on the cover. Samples of the membrane liner were taken for laboratory testing, the results of which were that the cover had reached the end of its life and was no longer fit for purpose.

Failure of the membrane could allow the treated water to be exposed to environmental pathogens such as bird faeces.

Sydney Water has a range of processes to conduct risk reviews and assessments (such as IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water (D0000799)) and identify emerging risks (e.g. Threat and vulnerability assessment

as part of the prevent aspect of the Incident Management Procedure). Despite these processes, we were unable to establish that:

- the risk of the membrane's failure had been appropriately assessed
- suitable mitigation measures were established in a timely manner commensurate with the public health risk.

We consider this a non-conformance. There was no evidence of water quality or public health impacts at the customers tap so we consider Sydney Water met the objective to supply safe drinking water in the audit period.

A risk assessment was conducted in November 2020 as part of the Needs Analysis Business Case (Attachment 3). The risk identification in the Business Case (Section 1.5) had identified a risk of asset failure leading to contamination of supply and proposed the following controls:

- develop plan to mitigate contamination risk in the interim, until covers are replaced
- replace cover.

This risk assessment appeared to be a desktop risk assessment as there was no participant list. NSW Health was not identified as a participant nor as a stakeholder to be engaged with.

We requested a copy of the mitigation plan but Sydney Water advised this had not been prepared by March 2021. We also noted discrepancies between the risk assessment in Attachment 3 and the risks in the Business Case, which we consider shortcomings.

The extreme wet weather event in late March 2021 resulted in a significant tear in the degraded membrane. E. coli was detected in routine monitoring of the reservoir on 7/4/2021 and 3/5/2021. The ADWG notes that E. coli is regarded as the most specific indicator of recent faecal contamination and E. coli should not be detected in any 100 mL sample of drinking water. Non-routine sampling of water near the tear locations conducted in May (6, 7, 11, 13) returned a number of positive results. These results are evidence of recent recontamination. Rechlorination at the outlet of the Potts Hill reservoir, maintains the chlorine at a level that inactivates chlorine-sensitive pathogens prior to customers taps.

A risk assessment was undertaken on the 14 May 2021 that considered the risk associated with the Potts Hill Reservoir refurbishment. This risk assessment identified the need to issue an emergency response notice to extend the Sydney Desalination Plant Operation.

Later documentation (05_24_180521_SDP_extension_final) referred to this risk assessment, stating "An expert risk assessment found there is a high potential public health risk due to loss of supply and/or contamination of our water supply if either one or both sections of the roof liners was to fail. Given the condition of the liner further failures are likely. Sydney Desalination Plant operation is required to mitigate public health and water supply risks effectively."

NSW Health was not invited to this risk assessment. This is a deficiency in the implementation of the DWQMS (elements 1 and 2). The 2016-17 operational audit contained a recommendation that required Sydney Water to "Invite NSW Health to all risk assessments (e.g, catchment 2 to tap or system risk assessments) undertaken in

relation to Sydney Water's systems (whether or not the system is operated by Sydney Water) that will consider public health risks." The 2020 Operational Audit report notes evidence of consultation with NSW Health that indicated a requirement for a NSW Health representative to be present when public health risks are assessed. Recommendation 4.1.3-1 is made to address this on-going issue.

Following the risk assessment, approval was sought and given (25/5/2021) to maintain the Sydney Desalination Plant in standby mode for up to 18 months. We have seen no evidence that Sydney Water as an organisation understood the risk mitigation provided by the continued operation of the SDP to manage the public health risk of membrane failure, prior to the May 2021 risk assessment.

Sydney Water has not yet conducted an incident investigation as required by the Drinking Water Management Manual (using the Incident investigation and lessons learned work instruction (SDIMS0041)) for the Potts Hill membrane failure. They advised this was because the incident is still in the active phase of management and the procedure assumes that the incident is an event which occurs on a single day. Sydney Water acknowledged that the procedure needs to be updated to allow flexibility for events which continue for weeks or months. Recommendation 4.1.3-2 is made to address this issue.

Sydney Water also commented that completing investigations too early can put a strain on resources responding to the incident and result in the loss of key learnings which may occur later in the incident phase. We acknowledge the tension between taking resources away from on-going events to conduct the debrief against both the loss of knowledge due to the delay and the potential for other events to arise from unaddressed root causes.

Element 1 Commitment to drinking water quality management

Drinking water quality policy

Sydney Water has provided sufficient evidence of implementation of the drinking water quality policy throughout the organisation and that the policy was visible and is communicated, understood and implemented by employees.

Sydney Water's Drinking Water Management Policy outlines the strategic intent relating to drinking water and the obligations of all employees and contractors.
Sydney Water makes the policy available to all staff via BMIS. It is also publicly available on the Sydney Water website. The policy was being updated as the audit period ended. We have accepted the email evidence (26/7/2021) provided of the Water Quality Improvement Manager distributing the policy to the Water Supply Production Managers, BOO partners (Suez, TRILITY and Veolia) and the Water Hub Manager, Western distributing it to his team on 23/8/2021 and scheduling a toolbox session for 1/9/2021 (an Outlook calendar appointment with all Production officers in the Western Hub was provided as evidence).

Sydney Water advised that key stakeholders with management responsibility for areas of the policy were involved in the policy review. Evidence was provided that the updated policy was communicated through the Product and Asset Leadership Group forum.

Macarthur WFP staff were updated on Sydney Water Drinking Water Policy as part of the training for the DWQMP (DWQMP training at Macarthur).

A photograph of the updated policy at North Richmond WFP was provided as part of the evidence package.

Regulatory and formal requirements

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to identify and document all relevant regulatory and formal requirements, ensure responsibilities are understood and communicated to employees and review requirements periodically to reflect any changes.

Sydney Water conducts regular legislative scans to identify changes to legislation to ensure the Compliance Accountability Register remains current. A fortnightly Legislative Update is circulated to key internal contacts (and made available to all staff on the intranet site) to communicate legislative changes. Key contacts are responsible to ensure broader communication of changes where applicable and that processes are in place to ensure ongoing compliance.

Engaging stakeholders

We identified a minor shorting in stakeholder engagement related to expired leases for groups operating on grounds above reservoirs. The leases outline the types of chemicals that can be used to maintain the grounds above the reservoir and requires consultation with Sydney Water before the use of other chemicals. In response to the draft report Sydney Water stated that once a lease expires the tenancy remains on holdover and the obligations stipulated in the agreement continues, therefore the lease requirements remain in place (i.e. manage grounds with approved chemicals). However, no evidence of formalisation of the obligation extending beyond lease expiry was provided as evidence so we still consider the shortcoming as it had the potential to impact water quality. This shortcoming should be addressed as part of Recommendation 4.1.1-1.

We requested and were provided with the dates for the SLG and JOG meetings in the audit period. These dates demonstrated that the required quarterly meetings were conducted. It was noted that the NSW Health Chief Health Officer attended one SLG meeting due to commitments with the COVID response. We requested and were provided with minutes of specified meetings (2921517 2021 Q1 SLG 16 March Final package).

Other than the issues with the expired leases and the failure to invite NSW Health to all risk assessments that considered public health (discussed in the Potts Hill reservoir section above). Sydney Water has demonstrated it has implemented the requirements of their DWQMS to identify all stakeholders who could affect, or be affected by, decisions or activities of the drinking water supplier, developed appropriate mechanisms and documentation for stakeholder commitment and involvement and that it regularly updates the list of relevant agencies apart.

Element 2 Assessment of the drinking water supply system

We tested the implementation of this element by auditing the operational risk assessments for Macarthur and North Richmond WFPs and Western and Southern Networks against the Operational Risk Assessment Workshop SOP (D0000799). We found many aspects of this procedure were not fully implemented. Recommendation 4.1.3-3 is made to address this finding. Our findings are detailed at the component level below. We also noted issues in the assessment of public health risk for Potts Hill Reservoir in the discussion at the start of this clause.

While some aspects of the DWQMS associated with the implementation of the Catchment to Customer (C2C) Water Quality Risk Review Procedure (BIMS0249) were not been implemented as described, evidence was provided that it was a one off change to the process for the 5 year review and had been endorsed by the JOG.

A specific 5-year major C2C water quality risk review was not conducted. Instead, the Catchment to Customer Major Review Report was developed collating the C2C risk assessments conducted during the past 5 years. A summary of the assessments conducted in the audit period are listed in Table 2-10.

Table 2-10. C2C risk assessments conducted in the audit period.

Date	Summary
20/7/2020	Assessed forward risks to water supply to inform the continuation of the operation of the Sydney Desalination Plant
14/1/2021	Prototype testing improved the operational envelope for Prospect. Water quality parameters to regularly review to inform risk assessment to supply identified.
29/3/2021	Risk assessment following the high rainfall in the catchment
7/5/2021	Follow up of the March risk assessment

Water supply system analysis

Under this component of the ADWG Sydney Water is required to fully implement the procedures and processes in the DWQMS to assemble a team with appropriate knowledge and expertise, construct a flow diagram of the water supply system from catchment to consumer, assemble pertinent information and document key characteristics of the water supply system to be considered and periodically review the water supply system analysis. We found shortcomings in Sydney Water's implementation for this component.

During the virtual site visit we found that the flow diagram for Macarthur WFP did not include all the recycle streams. A consequence of this was that risks from this stream were not identified in the operational risk assessment.

We were unable to establish that the full implementation of the Operational Risk Assessment Workshop SOP was met for Macarthur, Southern and Western Networks.

- The risk assessment team was not identified in the briefing information as required by the SOP. The roles (i.e. job titles) of the risk assessment team for Southern Network, Western Network and North Richmond WFP were not recorded in the

output paper. One participant in the North Richmond WFP workshop was identified only by a telephone number.

- No briefing material was sent prior to the Southern Network workshop (which included the Potts Hill delivery network). If the Incident Management Procedures were implemented appropriately, the threat of the Potts Hill reservoir roof tearing should have been identified prior to the risk review process (see discussion in element 6 of this clause).
- Briefing material did not identify current issues, emerging issues, critical assets / frequent failure assets, incidents and notifications to NSW Health in the previous 12 months for the Southern Network, Western Network and Macarthur WFP.
- Where a briefing paper was distributed prior to the workshop, it was provided one or two business days prior to the workshop not the two weeks stated in the SOP.

Assessment of water quality data

We found shortcomings in how Sydney Water assessed the historical data for their operational risk assessments, particularly for Macarthur WFP, Southern and Western Networks. The ADWG requirement, operational risk assessment SOP requirement and audit observation are synthesised in Table 2-11.

Table 2-11. Assessment of water quality data - summary of implementation compliance

ADWG Action	Operational water quality risk assessment	Observations
Assemble historical data from source waters, treatment plants and finished water supplied to consumers (over time and following specific events)	Section 4.1 (2) raw and treated quality for WFP and networks for 12 months and long-term (5 and 10 years), with charts and trends to show performance	North Richmond WFP briefing paper documents raw and treated water for 5 years Macarthur WFP briefing paper documented raw and treated water for 1 year No evidence of analysis for the Network risk assessments
List and examine exceedances	Section 4.1 (4) document current issues, emerging issues, critical assets / frequent failure assets, incident and notification to NSW Health in previous 12 months	Only completed for North Richmond WFP risk assessment
Assess data using tools such as control charts and trends analysis to identify trends and potential problems.	Section 4.1 raw and treated quality for WFP and networks for 12 months and long-term (5 and 10 years), with charts and trends to show performance	North Richmond and Macarthur WFPs risk assessments contained charts. Periods were limited to 5 years and 1 year as noted above

Hazard identification and risk assessment

This component requires Sydney Water to implement its procedures to:

- define the approach and methodology to be used for hazard identification and risk assessment
- Identify and document hazards, sources and hazardous events for each component of the water supply system
- estimate the level of risk for each identified hazard or hazardous event
- evaluate the major sources of uncertainty associated with each hazard and hazardous event and consider actions to reduce uncertainty
- determine significant risks and document priorities for risk management
- periodically review and update the hazard identification and risk assessment to incorporate any changes.

We found shortcomings and deficiencies in how Sydney Water implemented the Operational Risk Assessment Workshop SOP (D0000799).

- Chemical risks from the return of the residuals lagoon to the head of the works at Macarthur WFP was not identified or assessed.
- The risk report for Southern, Western and North Richmond WFP contains a condensed version of the risk register in Appendix A. The condensed version does not include:
  - uncontrolled risk
  - key controls (southern and western)
  - system component identified.
- The risk reports also do not include the required attachments specified in the SOP such as the briefing material or the risk methodology (including matrices and descriptors).

We did not have the network risk assessments that covered the underground reservoirs so were unable to establish whether chemical contamination from the grounds management had been considered and the controls in place identified.

Element 3 Preventive measures for drinking water quality management

Preventive measures and multiple barriers

We found deficiencies in how Sydney Water had implemented the requirements of their DWQMS for this component. For this component Sydney Water is required to fully implement its system to identify existing preventive measures from catchment to consumer for each significant hazard or hazardous event and estimate the residual risk; evaluate alternative or additional preventive measures where improvement is required and document the preventive measures and strategies into a plan addressing each significant risk. These deficiencies are discussed in the Potts Hill Reservoir discussion at the start of this clause.

Sydney Water assess preventative measures and identifies additional measures during the risk assessment workshops. These are documented in the risk assessment output documentation. For the Western and Southern Network Risk assessments there is an Open Actions register, and North Richmond had a WFP Actions register. Sydney Water is currently developing a process to have a Consolidated Action Plan to track where actions from the risk assessment are implemented. See Recommendation 2020-08.

Safe Work Method Statements for main repairs (site hygiene) was identified as a key control for Main breaks or perforations leading to ingress impacting water quality resulting in health impacts. We confirmed these processes were in place as part of the site visit.

Critical control points

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to assess preventive measures from catchment to consumer to identify critical control points, establish mechanisms for operational control and document the critical control points, critical limits and target criteria.

In assessing the implementation of this component, we have relied on the evidence provided by Sydney Water including:

- SWIRL records of incidents (SWIRL WQ Haz & Incidents 2020-21 MASTER FILE_Final.xls)
- debriefs for Macarthur and the wet weather event (Extreme Wet Weather Event - Expert Health Panel and Macarthur Draft v2.docx, Extreme Wet Weather Event - Joint WQ Response Draft.docx, Extreme Wet Weather Event March 2021 Debrief Report Final.pdf)
- screen shots of KOIOS
- Quarterly Drinking Water Quality Monitoring Report to NSW Health Fourth Quarter 2020-21 (2943179 Q4 2020-21 Drinking Water Report to NSW Health.pdf).

The evidence base for this component is weaker than previous years as we were unable to physically access the WFP site. The virtual nature of the auditing resulted in reduced sampling of this component.

Element 4 Operational procedures and process control

Operational procedures

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to identify procedures required for processes and activities from catchment to consumer and document all procedures and compile into an operations manual.

During the site visit we observed the implementation of procedures including spraying fittings before use and flushing before returning the line to service.

Sydney Water has provided evidence to satisfy the requirement for implementation of fluoridation operational procedures. For more detail see clause 4.3.1.

Our audit opinion is based on weaker evidence for this component than previous years as we were unable to physically access the WFP site. We did not conduct opportunistic sampling for this component.

Operational monitoring

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to develop monitoring protocols for operational

performance of the water supply system, including the selection of operational parameters and criteria, and the routine analysis of results and document monitoring protocols into an operational monitoring plan.

The evidence base for this component is weaker than previous years as we were unable to physically access the WFP site. The virtual nature of the auditing resulted in minimal on-site sampling of this component.

Evidence of exceptions arising from the operation monitoring were recorded in SWIRL, which provides evidence of implementation of the Laboratory Operational Monitoring Program (BMIS0045).

During the virtual site visit we saw evidence of the implementation in Macarthur WFP's daily operational sheets and were shown how this information is recorded into the laboratory spreadsheets.

We requested information on the impacts of COVID-19 to the monitoring program. Sydney Water advised the operational monitoring program was not affected by COVID-19.

Sydney Water has provided sufficient evidence to satisfy the operational monitoring requirements in the Fluoridation Code of Practice, including evidence of the daily mass balance, daily lab and online results for June 2021.

Macarthur WFP commenced using the KOIOS system in the audit period to analyse SCADA data to provide information on plant performance. This is discussed further under validation.

Corrective action

Sydney Water has provided sufficient evidence to demonstrate it has implemented the requirements of their DWQMS to establish and document procedures for corrective action to control excursions in operational parameters and establish rapid communication systems to deal with unexpected events. We note unresolved issues related to timely data sharing (Item 2 of the Major Event Debrief Water Quality Joint Response Between Water NSW, NSW Health and Sydney Water).

In assessing the implementation of this component, we have relied on the evidence provided by Sydney Water including:

- SWIRL records of incidents (SWIRL WQ Haz & Incidents 2020-21 MASTER FILE_Final.xls)
- debriefs for Macarthur and the wet weather incident (Macarthur Water Quality Deep Dive Findings, Extreme Wet Weather Event - Expert Health Panel and Macarthur Draft v2.docx, Extreme Wet Weather Event - Joint WQ Response Draft.docx, Extreme Wet Weather Event March 2021 Debrief Report Final.pdf)
- screen shots of KOIOS showing historical system performance at Macarthur WFP
- Quarterly Drinking Water Quality Monitoring Report to NSW Health Fourth Quarter 2020-21 (2943179)

Our audit opinion is based on weaker evidence for this component than previous years as we were unable to physically access the WFP site. We did not conduct opportunistic sampling for this component.

Equipment capability and maintenance

We identified deficiencies associated with equipment capability and maintenance. While Sydney Water has an established program for the regular inspection of all its reservoirs, the inspection frequency is time-based rather than risk-based. As the Potts Hill reservoir roof was recognised as being at end of life, the inspection program (and possibly process) should have been altered to account for the increased risk.

The identification and management of this issue was discussed in element 2 and is further discussed element 6 and in detail in Clause 5.5.

Auditing uses a sampling methodology rather than an exhaustive or complete assessment. We identified additional areas of concern but did not additionally examine these to form an opinion on whether they were shortcomings or deficiencies in the implementation of their DWQMS:

- The failure of chlorine dosing equipment at Orchard Hills. The Temporary Dosing Unit Sodium Hypochlorite at Nepean WFP had not been registered in MAXIMO correctly and Preventative Maintenance (PM) not completed. This increases the risk of asset failure and potential water quality issues.
- The delays in completing upgrade projects at North Richmond WFP
- The design basis for run of river systems included 2-3 days network storage. This allowed WFPs like Macarthur to shut down to let the initial spike of poor water quality to pass. This design basis is no longer valid limiting the operational flexibility of the plant.
- Discrepancies in calibration records for the Chlorine Hach Colorimeter (see discussion below)

The evidence base for this component is weaker than previous years as we were unable to physically access the WFP site and cross check physical records with those provided electronically. The virtual nature of the auditing resulted in reduced sampling of this component.

Other areas that we audited and found met the requirements of this component to ensure that equipment performs adequately and provides sufficient flexibility and process control and establish a program for regular inspection and maintenance of all equipment, including monitoring equipment are discussed below.

Sydney Water advised that portable field water quality testing equipment used by Customer Water Quality team for operational investigations are operated according to work instructions stored within the quality system. The procedure (WRF067 WTW Instruments-Field measurements of pH, conductivity and ORP) and calibration/ maintenance records for chlorine measurement and pH were supplied as examples:

- Calibration record pH WTW 01012021 (D0001760)
- Calibration records for HACH Colorimeter- 01012021 (D0001874)
- Macarthur Calibration Schedule Rev 2021.05.12.

We were unable to confirm the calibration frequencies from the information provided. The Hach Colorimeter – Chlorine quality control protocol have monthly and six-monthly checks. From the calibration sheets provided it appeared some calibrations were being

undertaken quarterly (e.g. 1347), however others (e.g. 1917) appeared on the calibration sheet only once. Sydney Water advised that attendance to the instrument monthly calibration checks at West Ryde Labs was affected by restrictions due to COVID-19. These included restrictions of attendance by outside staff entering buildings and liaising with lab staff and the impact if a determination of ' Vulnerable staff status' (related to 1347).

While the HACH Colorimeter Calibration check sheet showed that all instruments check were within the acceptance criteria on the form, the manufacturer recommends that the calibration on the DR300 should be checked every 3 months. We acknowledge the impacts of COVID-19 restrictions however we have not seen evidence of the formalisation of the reduced calibration frequency.

Table 2-12 shows the calibration frequency of three of the meters. The frequency is inconsistent between meters indicating the process had not been formalised.

Table 2-12. Calibration frequency

Meter	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21
1347	✓			✓				✓
1349					✓	✓	✓	✓
1719	✓				✓			

We make Recommendation 4.1.3-5 to address this shortcoming.

Sydney Water provided adequate evidence of fluoridation equipment maintenance being carried out according to their procedures. TRILITY staff explained the fluoride analyser maintenance process at Macarthur WFP during the site visit. It included regular laboratory fluoride analyser calibration by operations staff, daily comparison of lab results and online analyser to ensure consistency, monthly online fluoride analyser calibration and annual online analyser services. The list of fluoride system maintenance works carried out at North Richmond WFP in the audit period was sighted and found to be adequate.

Implementation of the asset management system is further discussed in Clause 5.5.

Materials and chemicals

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to ensure that only approved materials and chemicals are used and establish documented procedures for evaluating chemicals, materials and suppliers.

Evidence (before and after the audit date scope) was provided of the implementation of the Change Management checklist (WT0014CN0006 and WT0011CN0010)

We tested the implementation of the Quality Assurance of Hypochlorites Procedure (WPIMS517). This procedure requires 2 batches to be analysed per year. Sydney Water conducted one analysis as it only received one batch in the year. It conducted a second test at the end of the year (30/6/2021) to assess the chlorine residual at this time. The residual was below the minimum criteria and the recommendation did not explain why

the sample was acceptable. In the interviews, it was explained the batch was at the end of its life and the level of degradation was acceptable.

There is an opportunity for improvement (OFI 4.1.3-1) that where samples do not meet the required criteria but are considered acceptable, the justification should be provided in the comments.

We were advised in the questionnaire that North Richmond WFP follow common procedures (D0001375 and WT5232) for receiving and undertaking quality assurance checks for bulk chemicals.

We confirmed the disinfectant used for pipe hygiene was the same as the approved chemicals.

The procedure training database was sighted and satisfied the need for operations staff to be trained in the fluoride chemical procurement procedures to minimise chemical quality risks.

Element 5 Verification of drinking water quality

Drinking water quality monitoring

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to establish and document a sampling plan for each characteristic in the distribution system and water as supplied to the customer (including the location and frequency of sampling) and ensure monitoring data are representative and reliable.

We tested requirements documented in the Monitoring Plan - Annual Drinking Water Quality Plan 2020-21 with those reported in the North Richmond Delivery System Quarterly Drinking Water Quality Report April to June 2021. Sydney Water met the monitoring requirements for all the parameters where the information was available. Further discussion of the monitoring plan can be found in Clause 10.2

The Monthly Fluoride Report to NSW Health June 2021 was sighted and provided evidence that Sydney Water implemented the required fluoride monitoring outlined in the monitoring plans including two weekly samples in the reticulation and daily and online monitoring at the outlet of the WFP.

Consumer satisfaction

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to establish a consumer complaint and response program, including appropriate training of employees.

We confirmed the implementation of Sydney Water's customer complaints and response program through the following pieces of evidence:

- CRM 8000326112 – This complaint was associated with "worms" in a Brita filter. The CRM logged that there was a mesh aerator on the tap that would not let the worms through and advise the likely source was flies laying eggs in the moist environment of the filter.

- CRM 8000827240 - This complaint was regarding the dirty water in an industrial unit. The investigation showed it was the customer's hot water system.

The response to a series of dirty water complaints in Rouse Hill and Minchinbury zones (discussed in Corrective action below).

A staff performance review for the Development Program for Water Quality Scientist (D0001673).

Short-term evaluation of results

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to establish procedures for the daily review of drinking water quality monitoring data and consumer satisfaction and develop reporting mechanisms internally, and externally, where required.

We sighted an automated daily Labware notification for 30/6/2021. The email included the resample results for the E. coli detect at Colebee (INC-35724). The SWIRL record showed NSW Health had been notified on the 30/6/2021.

We noted a SWIRL record where the notification information to NSW Health was not entered accurately. INC-34605 recorded that NSW Health was notified verbally on the 14/4/2021. We queried the delay between the incident (12/4/2021) and the notification. We were provided with diary evidence of a notification to NSW Health on the 12/4/2021. Sydney Water and NSW Health confirmed a teleconference on the incident was conducted on the 14/4/2021.

Corrective action

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to establish and document procedures for corrective action in response to non-conformance or consumer feedback and establish rapid communication systems to deal with unexpected events.

A Discoloured Water Investigation Report – Rouse Hill & Minchinbury Zones provided evidence that Sydney Water implement processes to investigate and respond to customer feedback. The report investigated a cluster 59 of dirty water alerts logged in Maximo from 13:15 on 15/9/2020 until 10:54 the next day. The investigation showed a third-party contractor damaged a 150 mm water pipe which resulted in an increased flow of water in the area. The higher flowrate appeared to have resuspended material in the feed water main leading to the discoloured water calls. The water mains were flushed immediately in response to these elevated results. The recorded lessons learnt were:

"Third-party contractors need to be reminded to take care when undertaking work near Sydney Water Assets to avoid these types of issues from occurring.

Issues with debris and sand were experienced in the feed water main to the area were identified during commissioning that were indicative of poor housekeeping. Need to ensure that constructors practice good house-keeping to avoid debris and material entering new water mains during construction." [sic]

Sydney Water introduced a program of works to reinforce pipe hygiene requirements with its third-party contractors, as a result of lessons learnt, to reduce potential public health risks and minimise the number of dirty water events and discoloured water complaints. Sydney Water advised NSW Health in the 4th Quarter Drinking Water Quality Monitoring Report that the investigation and training rollout reduced the number and size of discoloured water events.

During the site visit we noted opportunities for improvement (OFI 4.1.1-1) in relation to processes and communication of pipe hygiene. We would suggest including the audit of third-party contractors as part of the OFI.

See Element 4 for additional commentary on corrective actions.

Element 6 Management of incidents and emergencies

Communication

Sydney Water has provided evidence to demonstrate it has implemented the requirements of their DWQMS to define communication protocols with the involvement of relevant agencies and prepare a contact list of key people, agencies and businesses and develop a public and media communications strategy.

We reviewed the Water Quality Management Contact List (D0001088). We did not observe any out-of-date entries.

We were provided with a list of water quality hazards and incidents logged in SWIRL (SWIRL WQ Haz & Incidents 2020-21 MASTER FILE_Final.xls). We reviewed four SWIRL incidents as part of the audit (INC-35724, INC-34440, INC-34566 and INC-34605). These showed the required notification to NSW Health (The recording of the time for INC-34605 is discussed elsewhere).

We infer shortcoming in the implementation of the Joint Communications Protocol including data sharing from the debriefs (Extreme Wet Weather Event - Expert Health Panel and Macarthur Draft v2.docx, Extreme Wet Weather Event - Joint WQ Response Draft.docx, Extreme Wet Weather Event March 2021 Debrief Report Final.pdf) and the report of the annual tripartite exercise (Tripartite Ex Joumana Report - All Agencies v0-2.pdf). The detailed findings note the action "to identify what information is required for each organisation to make informed, relevant, and timely decisions, and appropriate for Note. Similar action from Feb 20 event"

Incident and emergency response protocols

We found deficiencies in Sydney Water 's implementation of their DWQMS to:

- define potential incidents and emergencies
- document procedures and response plans with the involvement of relevant agencies
- investigate any incidents or emergencies and revise protocols as necessary.

These deficiencies relate to the Potts Hill Reservoir and were discussed at the start of this clause.

Over the past few years Sydney Water has been operating in a challenging environmental context. In conjunction with WaterNSW, it was managing projects to improve resilience and operational flexibility during the recent drought. The bushfires of 2019 and subsequent rains in February 2020 have resulted in ongoing treatment challenges due to raw water quality fluctuations. Sydney Water identified and responded to a number of significant incidents throughout 2020-2021, including a one in 60 year flood event with no impact on water quality to customers.

Sydney Water provided evidence that supported the implementation of this element including:

- testing of plans through the annual tripartite test of their emergency response plans (Tripartite Ex Joumana Report - All Agencies v0-2.pdf)
- training staff in Emergency Management – working in an emergency control centre through a training attendance sheet (27.05.2021 - Working In ECC Attendance Sheet.pdf and L2 Emergency Controller ECC - 09.06.2021 - 11.06.2021.pdf)

Sydney Water advised they currently have improvement projects linked to this element with the following work in progress:

- A review of the incident and lessons learnt procedure. The new procedure has been drafted and piloted. It is expected that the new procedure will be available in December 2021. This improvement includes the governance over improvement actions
- Resilience and Climate Change Adaptation Lead position was approved and the position has been filled following the audit period
- Project Wingarra has commenced to replace the incident management system (SWIRL)
- In 2020 the Business Impact Assessments were been complete and in 2021 the review of water product continuity plans is scheduled.

COVID-19

The COVID-19 pandemic required the development of process and site protocols to manage access:

- WRR and WS&P COVID-19 Controls (23rd June 2021, 26th June 2021)
- Covid Response_210520_Business Continuity Plan_COV19_Production_Water.pdf
- Covid Response_BOO Communication plan 080520.pdf
- COVID Safety Plan Nepean WFP (Covid Response_Covid Safe Plan - Nepean WFP.pdf)
- Protocol for resource sharing (Covid Response_Resource sharing protocol.pdf)
- Production Covid-19 “Greenfield” Project Decision Flowchart (Visio-Production_COVID-19_DF_Greenfiled Projects_Final_190820.pdf)
- Production Covid-19 Project, Maintenance Or Contractor Activity Decision Flowchart (Visio-Production_COVID-19_DF_Projects Mtce Contractor_Final_200820.pdf)

Although not provided as part of the audit evidence, Sydney Water developed a mobile water testing van to reduce the risk of transmission between sites. This van allowed specialists to conduct water testing without entering the WFP buildings.

These plans are consistent with the Sydney Water’s procedures and processes as well as the broader industry approach to pandemic planning and preparedness.

Extreme wet weather event

Following the wet weather Sydney Water conducted the following debriefs:

- Operational debriefs (commenced 26 April 2021 and were completed by 30 April 2021). These were used as inputs to the inter-agency debriefs.
- Extreme Wet Weather Debrief was conducted on 4 May 2021
- Wet weather debrief with WaterNSW and NSW Health conducted on 17 May 2021
- Wet Weather Event Debrief - Macarthur and Expert Health Panel conducted on 17 May 2021

Sydney Water also conducted an incident investigation (Deep Dive and Learnings into the Macarthur WFP performance), which commenced on 24 June 2021 and concluded on 13 August 2021. The work instruction (SDIMS0041) requires the investigation to be completed within 45 days.

Sydney Water advised:

Due to the complexity and scale of the incident, debriefs and investigations were held across multiple layers with various focus. It should be noted that the resources required for investigations and debrief continued to be actively involved in incident mode until May 2021 and the lessons learnt process was initiated, however there was a request for the process to be delayed due to continued commitment of resource to the management of the wet weather event.

Sydney Water believes the reasons for the delay are appropriate and are not material. It is acknowledged that the procedure could be updated to reflect this approach and provide flexibility for events which continue for weeks or months in duration. This wet weather event (which was broader in response than the Macarthur WFP alone) was managed for a prolonged period in the active phase of management after the rainfall initially commenced. A decision was made to delay the investigation due to the key resources required being still actively managing the water quality incident following the floods."

Element 8

Community consultation

Sydney Water has provided sufficient evidence to demonstrate it has undertaken activities that meet the requirements of the ADWG to assess requirements for effective community involvement and develop a comprehensive strategy for community consultation.

We found some aspects of the DWQMS associated with the community consultation were not implemented as described. We have graded this shortcoming in 4.1.1.

Sydney Water's Community Advisory Committee (formerly the Customer Council) has been working to an updated terms of reference since 1 July 2020. The Committee met four times a year during 2020-21 (3 September 2020, 19 November 2020, 3 March 2021, 20 May 2021) as required.

Sydney Water provided evidence that it has undertaken the Stakeholder Perceptions Survey 2021. The service critical high and medium customer results were provided as evidence.

In the questionnaire Sydney Water advised that it engages with major business customers that hold industrial trade waste consents through one on one Relationship Management Meetings with allocated Business Customer Representatives. An example of the format and outcomes of a relationship management meeting was provided (SAP - Consent to discharge industrial trade wastewater 23608 - relationship management meeting 240521). This document noted current daily water usage and irregular water use events. There were also fields for benchmarked water used and addition notes.

Sydney Water also provided evidence of broader customer engagement associated with their long-term water planning. This engagement was more focused on resilience and water security but it did canvass community attitudes to a range of water supply options including purified recycled water for drinking.

Communication

Sydney Water has provided sufficient evidence to demonstrate implementation of an active two-way communication program to inform consumers and promote awareness of drinking water quality issues.

Sydney Water provided evidence that it had implemented programs to understand their consumers. Evidence was provided for the:

- Quarterly Community Sentiment Monitor (April to June 2021)
- Quarterly Brand Tracker (April to June 2021)
- Quarterly Service Faults Tracker – (June 2021)
- Quarterly Stakeholder Perceptions Survey 2021 (Overview Report – All Stakeholders)

The Brand Tracker sampled residents (aged 16+) businesses, developer, and value makers (e.g. conveyancers). The brand interactions considered the top sources of awareness for Sydney Water. Water quality is considered within the study. Advocacy continues to be driven by satisfaction, specifically around the quality and reliability of water provided. The “quality water reliably” is tracked as a reason for advocacy among promoters (23%-37%) of advocacy among promoters was related to quality water reliably. Only 3-% of detractors identified this aspect as an area for improvement. This component of the survey provides evidence of Sydney Water’s 2 way communication program.

A slide deck of the CALD drinking water campaign update (culturally and linguistically diverse) that ran 4 June - 30 June 2021 addressing trust in drinking water and the social media comments were provided as evidence.

The Community Sentiment Monitor showed a decrease in people boiling tap water before drinking it. This was seen mainly amongst groups that spoke a language other than English at home. Taste is becoming more important amongst these groups and water filter use has increased amongst this group. The survey identified that taste was an additional issue to be addressed in communication.

Element 9 Research and development

Investigative studies and research monitoring

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to establish programs to increase understanding of the water supply system and use information to improve management of the water supply system.

Helix records that the Research and Innovation Program incorporates ongoing monitoring and review of emerging hazards and issues. The Program has a specific role to scan for emerging issues and report this to the JOG (as well as NSW Health and internally as required).

The JOG (Sydney Water, WaterNSW, and NSW Health) has an annually-recurring agenda item to scan for emerging risks to water quality. Each year a joint paper is presented to the JOG by Sydney Water and WaterNSW on emerging risks and approaches to their management. This is combined with the annual review of research and innovation related to water quality. Matters are escalated to the Health SLG as required.

We tested how the implementation of the Research program was monitored. Sydney Water monitors the R&I program through four metrics:

- innovation effectiveness index,
- industry recognition from their R&I program,
- implementation of R&I outcomes
- leveraging their investment.

These metrics are developed and listed in the R&I strategy. The R&I governance framework monitors program progression through various stage gates.

A monthly program status report is produced (an example after the audit period was provided). Sydney Water also produces an annual R&I highlights pack (The Research and Innovation Annual Highlight 2019-20)

We audited the impact of COVID-19 on the research programs. Sydney Water advised the programs were impacted by reduced access to facilities for researchers (including international laboratories). Formal knowledge transfer from researchers to operations has been delayed for the ARC Natural Organic Matter, Taste & Odour, or ARC Chloramination projects, due to COVID project delays. In these circumstances we do not consider the delays as evidence of a lack of implementation of this component.

Evidence was provided of the completed filter optimisation project at Macarthur WFP as per the 3-year Science and Technology Plan between SWC and TRILITY. The result of this research project is improved drinking water quality management by filter backwash optimisation.

While not provided as part of the evidence package, we are aware of on-going research projects into coagulation and disinfection optimisation at Macarthur WFP that align with the research projects in the plan.

Validation of processes

Sydney Water has provided evidence to demonstrate it has implemented the requirements of their DWQMS to validate processes and procedures to ensure that they are effective in controlling hazards and revalidate processes periodically or when variations in conditions occur.

The Drinking Water Quality Management System has requirements documented in the Drinking Water Management Manual and Helix. We have reviewed the evidence provided (Table 2-13).

Helix has an activity to report filter and disinfection performance monthly. We requested filter performance validation reports and primary disinfection validation reports for North Richmond WFP in the questionnaire. We were provided with a spreadsheet of the North Richmond Filter Turbidity Performance which contained minute-by-minute turbidity data for the six filters from 1/7/2020 to 15/8/2020. No filter exceeded the CCP. We were also provided with the annual review of water quality data in the North Richmond WFP Annual Risk Assessment Briefing Paper which showed that showed the plant had met the filtration and chlorination performance requirements.

Table 2-13. Evidence of validation activities

DWQMS requirement	Source	Implementation evidence
Ongoing validation of disinfection (c.t performance)	Drinking Water Management Manual, Helix	Screenshots of real time disinfection performance for April (Example of KOIOS disinfection online reporting.pdf)
Ongoing validation of filter performance	Helix	Screenshot of turbidity exceedance screen for Macarthur WFP in June 2021 (Example of KOIOS online Turbidity compliance reporting.png)
New processes are validated through a number of potential avenues including using benchtop, pilot-scale or full-scale experimental studies	Helix	During the audit period Sydney Water completed the design and construction of Nepean temporary water treatment plant, a microfiltration (MF) package membrane plant. The validation of MF membrane was performed as per USEPA membrane filtration guidance manual (Nepean TWTP -Validation of Pall Microza using MFGM model.pdf and Nepean TWTP-LRV validation Spreadsheet.pdf)
Revalidation of process is performed when variations in conditions	Drinking Water Management Manual	Executive summary of the report on the detailed pilot and prototype scale tests conducted to verification of filters performance at Prospect WFP for deteriorated quality raw water Filter verification tests determined the maximum production limit (filtration velocity) for a maximum limit of deteriorated quality raw water. These findings were presented at the National Ozwater conference.

Design of equipment

Sydney Water has provided sufficient evidence to demonstrate it has fully implemented the requirements of their DWQMS to validate the selection and design of new equipment and infrastructure to ensure continuing reliability.

Sydney Water provided the Nepean Water Filtration Plant – Concept Design – Basis of Design Report as evidence of the implementation of this component. Validation tests were conducted as part of the design development. The report set out the selection criteria of new equipment based on source water quality, treated water quality targets including health-based microbial targets and performance requirements of new assets. As part of the design development the validation tests are performed in bench scale jar tests.

Validation requirements including the details of criteria against which design of equipment is assessed are set out in the Basis of Design Report. In the audit period Sydney Water completed the detailed option assessment and concept design of Nepean WFP upgrade with new treatment process including dissolved air floatation (DAF), powdered activated carbon (PAC) dosing, Lamella Clarifier and new dual media filters. The Basis of Design report for concept design of Nepean WFP was provided as evidence which sets out CCPs and operational performance requirements of new treatment assets.

Element 10 Documentation and reporting

Management of documentation and reporting

We found minor shortcomings when auditing Sydney Water's Drinking Water Quality Management System in the implementation aspects of:

- Documenting information pertinent to all aspects of drinking water quality management
- Using a document control system to ensure current versions are in use
- Establishing a records management system and ensure that employees are trained to fill out records
- Periodically review documentation and revise as necessary

Examples of the shortcomings we found include:

- The Drinking Water Policy was finalised on the 21st July 2021 (email advice from water custodian), however the signed policy is dated on the 21/6/2021.
- On the 21/2/2021 there were over 60 controlled water quality documents (work instructions, forms and specifications) outstanding for review (DW documents overdue by 210221.xlsx). The average overdue date was 4 months
- Supporting documents did not document current practice
- Issues with the currency and relevance of the text in Helix (discussed in Elements 5 and 8 above)
- Older versions of documents still in use (e.g. SWMS 11 provided as evidence and Macarthur Drinking Water Quality Plan had an older version in Helix).

Recommendation 4.1.1.1-1 and Recommendation 2020-23 are relevant to these findings.

Reporting

We found a minor shortcoming arising from gaps in the public water quality reporting (discussed in Clause 10.2.2). We also reviewed two internal reports:

- The April 2021 Water Supply & Production Monthly Dashboard provides evidence of internal reporting associated with the drinking water management manual. This report summarises performance in water quality areas including customer complaints, water quality hazards identified and water quality incidents as well as progress with the drinking water quality improvement plan.
- The Water Quality Management Report is produced monthly by Monitoring, Design and Reporting for Water Supply and Production (2938771 June 21 WFP Water Quality Testing Report Final).

These reports are show that Sydney Water is undertaking its internal reporting requirements.

Recommendation

Recommendation 4.1.3-1: We recommend that by 30 June 2022 Sydney Water review process to ensure NSW Health is invited to all risk assessments which consider public health risks (across all relevant risk assessments, including. operational, incident management, projects)

Recommendation 4.1.3-2: We recommend by 30 June 2023 Sydney Water completes its current improvement project on incident investigations and its current review cycle of preventative aspects of the Incident Management and Emergency Management Procedures, such as business impact assessments and continuity plans and have evidence of implementation of the project outcomes.

Recommendation 4.1.3-3: We recommended by 30 June 2022 Sydney Water has evidence to demonstrate that the operational risk assessment workshop procedure (D0000799) has been fully implemented for both the WFP and networks. This includes the identification of all recycle streams in the PFD as per D0000685.

Recommendation 4.1.3-4: We recommend that by 30 June 2022 Sydney Water undertake a formal risk assessment on the residual lagoon at Macarthur WFP to identify circumstances where chemical spills and other contaminants may enter the lagoon and be returned to the head of the works and ensure processes and procedures for monitoring and managing these risks are adequate and implemented. This risk assessment may be undertaken as part of the annual risk review.

Recommendation 4.1.3-5: We recommend that by 30 June 2022 Sydney Water review the instrument calibration and checks for the Hach Pocket Colorimeter to ensure the requirements are clarified, documented and implemented.

Opportunities for improvement

OFI 4.1.3-1: We suggest that where chlorine chemical samples do not meet the required criteria but are considered acceptable, the justification should be provided in the comments section of the form.

Clause 4.2 – Recycled Water

Clause 4.2.1

Table 2-14. Clause 4.2.1 compliance grade

Subclause	Requirement	Compliance grade
4.2.1	Sydney Water must maintain a Management System that is consistent with the Australian Guidelines for Water Recycling and any requirements relating to water recycling specified by NSW Health (the Recycled Water Quality Management System).	Compliant (minor shortcomings)

Risk	Target for full compliance
The risk posed to public health and the environment from non-compliance with this clause could be significant.	Systems and processes in place to identify the requirements of the Australian Guidelines for Water Recycling in Sydney Water's context, a system, document or other which meets the intent of a Recycled Water Quality Management System and evidence to show how these requirements have been maintained

Summary of reasons for grade

Sydney Water has demonstrated that it is has a fully implemented Recycled Water Quality Management System, apart from shortcomings in the following areas:

- discrepancies between the monitoring plan in the Liverpool Recycled Water Quality Management Plan (RWQMP) and the Monitoring Plan – Recycled Water Quality: Compliance & Operations 2020-2021
- minor discrepancies between documentation version in change summary table and footers
- Work Instruction for Creation of Process Flow Diagrams (D0000685) has no specific instructions or examples for recycled water particularly around display of multiple CCP trains
- the Liverpool RWQMP contained two different flow diagrams and only one was consistent with the Work Instruction for Creation of Process Flow Diagrams.

We have seen sufficient evidence to confirm that the requirements have been met apart from shortcomings identified, which to date has not compromised the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.

This clause is graded Compliant (minor shortcomings).

Discussion and notes

Sydney Water manages its recycled water through a hierarchy of documents supported by its integrated management system. The Recycled Water Management Manual (RWMM) is a roadmap for their recycled water management system and provides the overall corporate management framework relevant to Sydney Water's operational recycled water schemes. The Recycled Water Management Manual is structured according to the elements, components and actions set out in the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) (AGWR)

'Framework for management of recycled water quality and use' (AGWR Framework). The Recycled Water Management Manual is supported by scheme specific recycled water quality management plans. During the audit, we focused on documentation for Liverpool WRP; with the Recycled Water Quality Management plan – Liverpool WRP (WQ0003, v4, dated 17/8/2020) provided as evidence.

In considering the 'maintain' requirement of this clause, we have audited the water quality management system against the requirements of the AGWR Framework. The audit scope was for Elements 1 – 6 and 10 – 12 of the Framework.

Element 1 Commitment to responsible use and management of recycled water quality

Responsible use of recycled water

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to involve agencies (i.e. stakeholders) with responsibilities and expertise in protection of public and environmental health and ensure that design, management and regulation of recycled water schemes is undertaken by agencies and operators with sufficient expertise.

Sydney Water's Recycled Water Management Manual lists stakeholders common to all recycled water schemes and the Liverpool Recycled Water Quality Management Plan (RWQMP) has stakeholders that are specific to that scheme.

Sydney Water engages with these stakeholders on recycled water through:

- six monthly recycled water customer meetings
- quarterly Joint Operation Group meetings involving NSW Health
- four yearly review and update of the RWQMP.

Sydney Water ensures key staff involved in the operation of the recycled water schemes have the required skills by including recycled water requirements in their position descriptions.

Regulatory and formal requirements

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to identify and document all relevant regulatory and formal requirements, identify governance of recycled water schemes for individual agencies, designers, installers, operators, maintainers, owners and users of recycled water, ensure that responsibilities are understood and communicated to designers, installers, maintainers, operations employees, contractors and end users and review requirements periodically, to reflect any changes.

The Compliance Accountability Register identifies all legislation that has high and lower significance for Sydney Water. This register also identifies the accountable group in Sydney Water, key compliance measures and measures to evaluate compliance.

Sydney Water have a Regulatory Scanning Procedure and update the Compliance Accountability Register annually. The Compliance Accountability Register was reviewed in January 2021 by key managers responsible for compliance.

Sydney Water also maintains an Environmental External Requirements Register which identifies systems and responsibilities to manage environmental aspects. This register is reviewed annually.

The Environmental External Requirements Register was reviewed in March 2021 by key contacts.

Sydney Water hold quarterly Joint Operations Group (JOG) meetings with NSW Health and are actively involved with the Water Services Association of Australia (WSAA) to ensure it is informed early of any change to standards or guidelines related to recycled water.

Position descriptions for key staff involved in recycled water include requirements to comply with legislation and guidelines including AGWR and the RWQMP.

Partnerships and engagement of stakeholders

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to identify all agencies with responsibilities for water resources and use of recycled water; regularly update the list of relevant agencies, establish partnerships with agencies or organisations as necessary or where this will support the effective management of recycled water schemes, identify all stakeholders (including the public) affecting, or affected by, decisions or activities related to the use of recycled water, engage users of recycled water; ensure responsibilities are identified and understood, develop appropriate mechanisms and documentation for stakeholder commitment and involvement.

- Key stakeholders are identified in Sydney Water's Recycled Water Management Manual and the Liverpool RWQMP.
- Sydney Water have customer agreements with each recycled water end user and hold six monthly meetings with each customer.
- Sydney Water engage with NSW Health through the quarterly Joint Operations Group meetings.
- Sydney Water review each RWQMP every four years including a risk review involving all stakeholders.
- Position descriptions for key staff involved in recycled water include requirements to engage and develop relationships with key stakeholders including regulators and recycled water customers.

Recycled water policy

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to develop a recycled water policy, endorsed by senior managers, to be implemented within an organisation and ensure that the policy is visible and is communicated, understood and implemented by employees and contractors.

Sydney Water's Recycled Water Management Policy outlines the strategic intent relating to recycled water and the obligations of all employees and contractors. The policy was updated on 21/6/2021 to include specific commitment to manage excess or out of specification recycled water and to provide safe and reliable supply to customers. It is implemented through the Recycled Water Management Manual.

Element 2 Assessment of the recycled water system

Intended uses and source of recycled water

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to identify sources of water, identify intended uses, routes of exposure, receiving environments, endpoints and effects and consider inadvertent or unauthorised uses.

The Liverpool RWQMP and the Hoxton Park risk assessment report identifies sources of wastewater for each scheme including the total number and annual volume of different trade waste groups.

The Liverpool RWQMP and Hoxton Park risk assessment report also identifies routes of exposure and different groups that could be exposed as well as the health and environmental hazards and causes of inadvertent or unauthorised uses.

Target log reduction values have been developed based the routes of exposure and the AGWR.

Recycled water system analysis

We found minor shortcomings for this clause with the procedure for preparing flow diagrams lacking specific requirements for recycled water.

Otherwise, Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to assemble pertinent information and document key characteristics of the recycled water system to be considered, assemble a team with appropriate knowledge and expertise, construct a flow diagram of the recycled water system from the source to the application or receiving environments and periodically review the recycled water system analysis.

Recycled water supply system analyses are reviewed prior to detailed recycled water quality risk reviews. The makeup of the assessment team and the data required for analysis is described in the Recycled Water Risk Assessment Workshop SOP (D0001681, v3, dated May 2021).

Sydney Water have a process in place for the development of process flow diagrams, Work Instruction for Creation of Process Flow Diagrams (D0000685, dated 25/8/2021). While this document is current and comprehensive, it appears to have been written around drinking water and has no specific examples for recycled water. For example, steps 6 and 7 require individual filters to be shown and numbered but is silent on whether multiple trains on recycled water CCPs must also be shown.

The flow diagram in Section 3.2 of the Liverpool RWQMP is consistent with the requirements of the work instruction. There is a second flow diagram in Section 2.2 of the Liverpool RWQMP that is not consistent with the work instruction and has no version control.

Assessment of water quality data

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to assemble historical data about sewage, greywater or stormwater quality, as well as data from treatment plants and of recycled water supplied to users; identify gaps and assess reliability of data; and assess data (using tools such as control charts and trends analysis) to identify trends and potential problems.

Sydney Water has a process in place for assembling and assessing historical water quality data for detailed risk reviews (D0001681) with information compiled in the risk assessments briefing and output reports. The requirements for data analysis included in the SOP are appropriate.

Hazard identification and risk assessment

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to:

- define the approach to hazard identification and risk assessment, considering both public and ecological health
- periodically review and update the hazard identification and risk assessment to incorporate any changes
- identify and document hazards and hazardous events for each component of the recycled water system
- estimate the level of risk for each identified hazard or hazardous event
- consider inadvertent and unauthorised use or discharge
- determine significant risks and document priorities for risk management
- evaluate the major sources of uncertainty associated with each hazard and hazardous event and consider actions to reduce uncertainty, apart from minor shortcomings identified with inconsistencies across risk documentation

Requirements for risk assessments are detailed in the Recycled Water Risk Assessment Workshop SOP (D0001681, v3, dated May 2021). Section 2.0 Scope of this risk assessment SOP was updated in the audit period to include annual reviews of each recycled water scheme through distribution of the risk register to the internal operations team.

Sydney Water are currently reviewing their Corporate Risk Matrix to rectify discrepancies in descriptors in accordance with Recommendation 2020-06. Progress against this is currently overdue and is discussed further in the section for this recommendation.

Element 3 Preventive measures for recycled water management

Preventive measures and multiple barriers

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to:

- identify existing preventive measures system-wide for each significant hazard or hazardous event, and estimate the residual risk

- identify alternative or additional preventive measures that are required to ensure risks are reduced to acceptable levels
- document the preventive measures and strategies, addressing each significant risk.

Preventive measures are documented in scheme specific management plans and reviewed in the risk assessments. Section 3.1 of the Recycled Water Quality Management plan for Liverpool WRP (WQ0003) documents treatment and end user controls for the scheme.

Additional measures are identified during the risk assessment workshops and documented in the risk assessment output documentation. Long-term actions and actions that require implementation across multiple schemes are entered into the improvement plan. Short-term actions for a single scheme are managed through the Hub Action List. Subject matter experts are used to determine which actions are entered into which system.

Critical control points

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to assess preventive measures throughout the recycled water system to identify critical control points, establish mechanisms for operational control and document the critical control points, critical limits and target criteria.

The Recycled Water Product Specifications (D0000096, v5, dated August 2020) identifies key preventative measures including critical control points, operational control points, their limits and target performance levels. The basis for critical control points is documented in the specification.

The critical control points in the recycled water specification were consistent with those in the Recycled Water Quality Management Plan for Liverpool WRP (WQ0003). Additional CCPs for primary and secondary treatment performance checks and flood lift pump stations are included for Liverpool WRP.

Element 4 Operational procedures and process control

Operational procedures

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to identify procedures required for all processes and activities applied within the whole recycled water system (source to use), document all procedures and compile into an operations manual.

Operational procedures are documented in BMIS. Procedures relevant to Liverpool WRP, their version control details, dates and required review dates were sighted in the database. All documents viewed were current with no documents marked as expired. Procedures existed for sodium hypochlorite disinfection, condition monitoring, wet weather and instrument calibration, incident response and reporting. The procedures were considered adequate to cover all aspects of the Liverpool WRP.

Operational monitoring

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to develop protocols for operational performance of the recycled water supply system, including the scientifically justified selection of operational parameters and criteria, and the routine analysis of results and to document monitoring protocols into an operational monitoring plan.

The Liverpool WRP Process Monitoring Workflow SOP (LVTP0014, v10, dated 21/6/21) includes process monitoring testing and recording of the treatment process. The process monitoring checklists include target ranges for readings.

The Liverpool WRP SCADA scheme continuously monitors online analytical instrumentation including CCPs and position of valves. Screenshots of trends of free chlorine, ammonia and valve position to each end user were provided as evidence.

Operational corrections

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to establish and document procedures for corrective action where operational parameters are not met and establish rapid communication systems to deal with unexpected events.

The Recycled Water Quality Event Management Plan, Integrated Management System (WR5271, v12, dated 1/6/2020) is the overarching process for corrective actions of non-conformances. This plan also includes a table of notifiable events including triggers and responses.

The Recycled Water Quality Management Plan for Liverpool WRP (WQ0003) documents corrective actions for critical and operational limit exceedances.

Equipment capability and maintenance

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to ensure that equipment performs adequately and provides sufficient flexibility and process control and establish a program for regular inspection and maintenance of all equipment, including monitoring equipment.

Schedules for calibrations are accessed through BMIS. The Liverpool WRP – Online Instrument Calibration SOP (DOC0001, v5, dated 1/3/2021) provides instructions for inspections, cleaning and calibration of online instruments for the Liverpool WRP.

Liverpool WRP Process Monitoring Workflow (LTVP0014, v10, dated 21/6/2021) has a step to check the online recycled water instruments three times a week using portable pH and chlorine meters. The procedure cross references Online instrument Calibration SOP (DOC0001) and Laboratory Instruments Calibration SOP (LVTP0067).

Asset management is audited in Clause 5.5.

Materials and chemicals

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to ensure that only approved materials and chemicals are used and establish documented procedures for evaluating chemicals, materials and suppliers.

Approved treatment chemicals are covered under Sydney Water chemical specification documentation and supply contracts. A sample chemical specification was viewed for Sodium Hypochlorite.

The Wastewater and Recycled Water Bulk Chemical Delivery SOP (D0001388, v1, dated March 2020) details the work instruction for receiving and unloading of bulk chemicals, including chemical verification analysis required. A shortcoming is noted that the bulk chemical delivery SOP is not referenced in the Liverpool Recycled Water Quality Management plan.

Element 5 Verification of recycled water quality and environmental performance

Recycled water quality monitoring

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to determine the; characteristics to be monitored, points at which monitoring will be undertaken and frequency of monitoring, other than a minor shortcoming of discrepancies between the monitoring plan and the Liverpool RWQMP

Monitoring protocols for verification system performance are documented in a Monitoring Plan. The Monitoring Plan – Recycled Water Quality: Compliance & Operational 2020-2021 (DD 2646125, dated 1/7/20) was provided as evidence of documentation of verification monitoring requirements. Monitoring schedules for Liverpool WRP irrigation are included in Appendix 5 Table 3 of the monitoring plan.

The monitoring plan for each recycled water scheme is duplicated in Monitoring Plan – Recycled Water Quality: Compliance & Operations 2020-2021 (DD 2646125, dated 1/7/20). Discrepancies between the two monitoring plans for Liverpool WRP were noted and shown in Table 2-15.

Table 2-15. Discrepancies between Liverpool RWQMP and Recycled Water Monitoring Plan

Parameter	RWQMP	2020-21 Monitoring Plan
Temperature monitoring at LP0076	Weekly	Not included
Turbidity monitoring at LP0076	Not included	Weekly
Free chlorine monitoring at LP0076	Not included	Weekly
Total chlorine monitoring at LP0076	Not included	Weekly
Un-ionised H2S monitoring at LP0076	Monthly	Not included
Surfactants monitoring at LP0076	Not included	Monthly
Phenol monitoring at LP0076	Not included	Monthly

Sydney Water have advised it intends to remove the monitoring plan from the scheme RWQMPs and provide a link to the monitoring plan. This should avoid future discrepancies between the documents.

Application site and receiving environment monitoring

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to determine the characteristics to be monitored and the points at which monitoring will be undertaken.

Verification monitoring at receiving environments is described above in Recycled Water Monitoring. The Recycled Water Management Manual states that responsibility for end use monitoring is dependent on the end use. The Liverpool Recycled Water Quality Management Plan states that the scheme end users are responsible for the environmental discharge and monitoring on their site.

Documentation and reliability

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to establish and document a sampling plan for each characteristic, including the location and frequency of sampling, ensuring that monitoring data is representative and reliable as discussed in the Recycled Water Quality Monitoring component above.

Satisfaction of users of recycled water

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to establish an inquiry and response program for users of recycled water, including appropriate training of people responsible for the program.

The Business Customer Representative provides quarterly quality reports to end users.

The formal, planned communication channel for customers supplied with recycled water under Recycled Water Supply Agreements is 6-monthly recycled water customer meetings. These are run by an assigned Business Customer Representative. The Business Customer Representative can also respond to other enquiries relating to recycled water as they arise.

Short-term evaluation of results

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to establish procedures for the short-term review of monitoring data and satisfaction of users of recycled water and develop reporting mechanisms internally and externally, where required.

Nonconformance of operational monitoring data results in an immediate automated email to the plant team.

The Recycled Water Reporting Procedure (MP0021) outlines the roles and responsibilities of the key stakeholders involved in the preparation of various recycled water reports and associated material.

Quarterly reports are sent to NSW Health and recycled water customers with the operational monitoring results.

The Business Customer Representative provides quarterly quality reports to end users (one example each from Liverpool Golf Club and Australian Turf Club were provided as evidence) to highlight the status of recycled water quality.

Corrective responses

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to establish and document procedures for corrective responses to nonconformance or feedback from users of recycled water and establish rapid communication systems to deal with unexpected events.

The Recycled Water Quality Event Management Plan, (WR5271, v12, dated 1/6/2020) is the overarching the general process for corrective actions of non-conformances. Element 6 Management of incidents and emergencies of the Liverpool WRP Incident Response Manual, Integrated Management System (D0001234.15, v2, v8, 7/7/2019) documents the process for incidents specific to Liverpool.

The Liverpool, Unit Process Guidelines (UPG) specifies the corrective actions / process troubleshooting guide for chlorination operation where operational parameters are not met. A troubleshooting table is provided with causes and checks and corrective actions for high faecal coliforms, low free chlorine and unstable free chlorine. The corrective responses are considered adequate.

The process specification (D0001181) lists the target operational parameter ranges for Liverpool. These ranges are copied into the process monitoring workflow check sheet.

Element 6 Management of incidents and emergencies

Communication

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to define communication protocols with the involvement of relevant agencies and prepare a contact list of key people, agencies and stakeholders and develop a public and media communications strategy.

Recycled water non-conformances are communicated according to the procedure in the Recycled Water Quality Event Management Plan (WR5271, v12, dated 1/6/2020). Figure 1 of the Plan includes a flowchart of the incident escalation and notification process. The document covers scheme specific events and lists the actions or response for the event by the responsible officer.

The Georges River Hub Contacts List (D0001910) provides the detailed contact list for internal Sydney Water personnel, contractors and external agencies.

Incident and emergency response protocols

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to define potential incidents and emergencies and document procedures and response plans with the involvement of relevant agencies, train employees and regularly test emergency response plans and investigate any incidents or emergencies and revise protocols as necessary.

Recycled Water Quality Event Management Plan (WR5271) documents potential incidents and procedures at the plants and the network including:

- short-term outage of key water treatment processes or equipment
- failure of key water treatment processes or equipment
- inadequate disinfection levels (in the network)
- customer complaints/third party allegation
- cross connection/backflow
- high risk broken mains
- other recycled water quality results in the network
- security breaches
- threats/sabotage
- natural events
- effluent quality
- inappropriate or un-authorised use of recycled water.

Element 10 Documentation and reporting

Management of documentation and records

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to document information pertinent to all aspects of recycled water quality management, develop a document-control system to ensure current versions are in use, establish a records-management system, ensure that employees are trained to complete records and periodically review documentation and revise as necessary.

Sydney Water uses the same systems for the management of records as discussed under Element 10 of Clause 4.1.1.

During the process of the audit the Recycled Water Risk Assessment Workshop SOP (D001681) was found to have different version information in the footer and the change history table. Discrepancies between the Liverpool RWQMP and the Recycled Water Quality: Compliance & Operations 2020-2021 are discussed above in Recycled Water Monitoring.

Reporting

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to establish procedures for effective internal and external reporting, and produce an annual report aimed at users of recycled water, regulatory authorities and stakeholders.

Table 10-1 in the Recycled Water Management Manual (BMIS0260) summarises the key compliance (i.e. external) reporting activities for recycled water. Sydney Water produces:

- system-specific quarterly drinking water quality monitoring reports for the public
- quarterly recycled water quality monitoring reports for NSW Health
- annual Compliance and Performance Report (water quality) for IPART and NSW Health.

Sydney Water provided procedures for Preparing the Annual DWMS & RWMS Compliance Report for IPART and a work instruction for preparing the monthly fluoride report to NSW Health.

While Sydney Water does not document the requirement to produce an annual (recycled water) report for end users, it does produce quarterly irrigation water quality reports provided to end users. Sydney Water has advised that the fourth quarterly report functions as the annual report. As quarterly reporting is more frequently than annual, we consider this requirement met.

Element 11 Evaluation and audit

Long-term evaluation of results

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to collect and evaluate long-term data to assess performance and identify problems and document and report results.

Sydney Water has procedures and processes to conduct long-term analysis of recycled water quality. The Preparation of Recycled Water Quarterly Reports requires a statistical analysis of a 12-month rolling window of data.

Long-term water quality data is also analysed during the scheme risk assessment. The statistical analysis of water quality data (10 years) is trended and checked against AGWR microbiological, short-term values and long-term values. This analysis is presented in scheme risk assessment reports to inform the stakeholders and included in the final risk assessment report as required under the Recycled Water Risk Assessment Workshop SOP (D0001681, version 3, May 2021).

Audit of recycled water quality management

We found a shortcoming in Sydney Water's audit procedures that did not reference or provide guidance on the audit of the recycled water management systems.

The 2LOA Audit Procedure (619010, dated 22/11/2019) outlines the process for second line of assurance (2LOA) audit and inspection program of internal management systems. This procedure only refers to quality management systems and makes no reference to the recycled water management systems or the AGWR. While outside the scope of this audit the Management Review Procedure also does not include requirements under the ADWG or the DWQMS.

Processes are established through BMIS to track the audit results. In the interviews we also established that findings from an audit at one plant are transferred to all plants if the findings are not site-specific issues.

The RWQMS is also subject to the operational licence audit (this report).

Element 12 Review and continuous improvement

Review by senior management

We found a shortcoming in Sydney Water's management review procedure that does not reference the recycled water systems and did not include its obligation for recycled water under the AGWR.

The Management Review Procedure (618953, version 5, 1/10/2019) includes reviews of all management systems. The procedure includes review inputs, frequency and management accountability. Inputs include incidents, monitoring, audit results and corrective actions. The General Manager – Customer Delivery is shown as having accountability for recycled water management systems. The procedure however does not reference the AGWR as a compliance obligation in Section 6.3 and does not list the elements of the AGWR or the RWMM as system inputs or outputs in Appendix 1.

While outside the scope of this audit the Management Review Procedure also does not include requirements under the ADWG or the DWQMS.

Senior managers attend meetings of the Senior Leadership Group and Joint Operations Group with NSW Health including discussion on recycled water.

Recycled water quality management improvement plan

Sydney Water has provided sufficient evidence to demonstrate it has met the AGWR requirements to develop a recycled water quality management improvement plan and ensure that the plan is communicated and implemented, and that improvements are monitored for effectiveness.

Sydney Water maintains the Recycled Water Quality Improvement Register with progress and completion entered during the audit period.

Sydney Water had processes to communicate and implement the plan including presenting the plan to NSW Health during the quarterly JOG meetings.

Actions from the recycled water risk assessment are transferred either to the Hub Action List or the Recycled Water Improvement Plan Register depending upon their significance. Risks associated with CCPs and interlocks are transferred to the Recycled Water Improvement Plan Register. If actions apply to multiple plants, these are also carried into the improvement plan.

Recommendations

Recommendation 4.2.1-1: We recommend by 30 June 2022, Sydney Water resolve or remove the discrepancies between the monitoring plans in the Liverpool RWQMP and the annual Recycled Water Monitoring Plan.

Recommendation 4.2.1-2: We recommend by 31 December 2022, Sydney Water update Work Instruction for Creation of Process Flow Diagrams (D0000685) to include specific instructions and examples for recycled water. Update all recycled water flow diagrams to be consistent with the updated work instruction. Update the Liverpool RWQMP to only include one flow diagram.

Recommendation 4.2.1-3: We recommend by 30 June 2022, Sydney Water incorporate management review requirements for recycled water and drinking water management systems into the Management Review Procedure.

Recommendation 4.2.1-4: We recommend by 30 June 2022, Sydney Water incorporate audit requirements for recycled water and drinking water management systems into the 2LOA Audit Procedure.

Opportunities for improvement

OFI 4.2.1-1: Resolve the version and revision date discrepancies between the document change tables and the footers in the Recycled Water Risk Assessment Workshop SOP (D001681).

Clause 4.2.3

Table 2-16. Clause 4.2.3 compliance grade

Subclause	Requirement	Compliance grade
4.2.3	Sydney Water must ensure that the Recycled Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Recycled Water Quality Management System and to the satisfaction of NSW Health.	Compliant (minor shortcomings)

Risk	Target for full compliance
If the Recycled Water Quality Management System is not fully implemented, there is a high risk that Sydney Water may not be able to effectively manage the risk to public health and the environment.	Evidence that the Recycled Water Quality Management System is fully implemented and that all relevant activities are carried out in accordance with the Recycled Water Quality Management System. Evidence to show that NSW Health is satisfied with the Recycled Water Quality Management System and its implementation.

Summary of reasons for grade

Sydney Water has demonstrated that it has a fully implemented Recycled Water Quality Management System, apart from a shortcoming noted during the site visit of Liverpool WRP that the pH buffer solutions used for calibration of the handheld instrument were marked with the date they were opened however there is no procedure to describe how long after this date disposal of the reagents is required.

We have seen sufficient evidence to confirm that the requirements have been met apart from shortcomings identified, which to date has not compromised the ability of the utility to achieve defined objectives or assure controlled processes, products or outcomes.

This clause is graded Compliant (minor shortcomings).

Discussion and notes

Evidence was provided of engagement between Sydney Water and NSW Health (email correspondence from NSW Health dated 14/11/19). In this email, NSW Health indicated

satisfaction with implementation of the recycled water management systems would require that Sydney Water:

- regularly update the Joint Operational Group (JOG) on implementation of the management system and action on the improvement register
- demonstrate a record of consultation with NSW Health prior to the JOG
- consult NSW Health on significant changes proposed to the management system
- allow adequate time for consultation with NSW Health and incorporation of feedback prior to significant changes
- implement a system of internal review of the management system with NSW Health involvement.

Sydney Water provided JOG meeting minutes, email correspondences, Recycled Water Quality Annual Compliance Report and Quarterly Reports to NSW Health as evidence of their meeting NSW Health's requirements for satisfaction.

Element 1 Commitment to responsible use and management of recycled water quality

Responsible use of recycled water

Sydney Water has provided sufficient evidence to demonstrate implementation of the Recycled Water Quality Management System requirements to involve agencies (i.e. stakeholders) with responsibilities and expertise in protection of public and environmental health and ensure that design, management and regulation of recycled water schemes is undertaken by agencies and operators with sufficient expertise.

Sydney Water provided minutes of the following meetings with these stakeholders on recycled water:

- six monthly recycled water customer meetings for Liverpool WRP in accordance with the Liverpool RWQMP
- quarterly Joint Operation Group Meetings involving NSW Health in accordance with the RWMM.

Sydney Water has position descriptions for all key staff involved in the operation of recycled water schemes that include training requirements specific to recycled water and requirements to comply with the RWQMP.

Regulatory and formal requirements

Sydney Water has provided sufficient evidence to demonstrate implementation of the Recycled Water Quality Management System requirements to:

- identify and document all relevant regulatory and formal requirements
- identify governance of recycled water schemes for individual agencies, designers, installers, operators, maintainers, owners and users of recycled water
- ensure that responsibilities are understood and communicated to designers, installers, maintainers, operations employees, contractors and end users
- review requirements periodically, to reflect any changes.

Sydney Water conducts regular legislative scanning to identify changes to legislation to ensure the Compliance Accountable Register remains current. A fortnightly Legislative

Update is circulated to key internal contacts (and made available to all staff on the intranet site) to communicate legislative changes. Key contacts are responsible to ensure broader communication of changes where applicable and that processes are in place to ensure ongoing compliance.

Sydney Water held quarterly Joint Operations Group meetings with NSW Health during the audit period. Minutes of these meetings include discussion on recycled water management.

Position descriptions for key staff involved in recycled water include requirements to comply with legislation and guidelines including AGWR and the RWQMP.

Partnerships and engagement of stakeholders

Sydney Water has provided sufficient evidence to demonstrate implementation of the Recycled Water Quality Management System requirements to:

- identify all agencies with responsibilities for water resources and use of recycled water; regularly update the list of relevant agencies
- establish partnerships with agencies or organisations as necessary or where this will support the effective management of recycled water schemes
- identify all stakeholders (including the public) affecting, or affected by, decisions or activities related to the use of recycled water
- engage users of recycled water; ensure responsibilities are identified and understood
- develop appropriate mechanisms and documentation for stakeholder commitment and involvement.

Sydney Water provided minutes of the meetings with Liverpool Golf Club (26/11/20) and Warwick Farm Racecourse (26/11/20). All minutes included discussion on recycled water including recycled water quality, recycled water awareness, cross connections, backflow prevention, and site controls.

Minutes of the quarterly Joint Operation Group Meetings for Quarter 2 were provided and included discussion on recycled water quality exceptions and upcoming activities on recycled water systems.

Sydney Water also provided the contact list for the Georges River Hub which included all current contacts in relevant agencies responsible for recycled water including NSW Health and EPA and was updated on 23/11/20.

Recycled water policy

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System requirements to develop a recycled water policy, endorsed by senior managers, to be implemented within an organisation and ensure that the policy is visible and is communicated, understood and implemented by employees and contractors.

Sydney Water's Recycled Water Management Policy outlines the strategic intent relating to recycled water and the obligations of all employees and contractors. The policy was updated on 21/6/2021 and uploaded to BMIS. Sydney Water staff were able to locate

and view the policy on BMIS during the interviews. It is implemented through the Recycled Water Management System.

Sydney Water makes the policy available to all staff via BMIS. It is also publicly available on the Sydney Water website.

Key stakeholders with management responsibility for areas of the policy were involved in the policy review and the updated policy was communicated through the Product and Asset Leadership Group forum.

Element 2 Assessment of the recycled water system

Intended uses and source of recycled water

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to identify the sources of water, intended uses, routes of exposure, receiving environments, endpoints and effects and consider inadvertent or unauthorised uses.

Review of intended uses and sources of recycled water is undertaken as part of the risk assessment review process. Section 2.1 of the Risk Assessment: Hoxton Park Recycled Water Scheme Briefing Paper (March 2021) and Section 2.1 of the Risk Assessment Report Hoxton Park Recycled Water Scheme (July 2021) was provided as evidence of this review. These documents met the requirement of this component and the review was undertaken in accordance with the Recycled Water Risk Assessment Workshop SOP (D0001681).

Recycled water system analysis

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to:

- assemble pertinent information and document key characteristics of the recycled water system to be considered
- assemble a team with appropriate knowledge and expertise
- construct a flow diagram of the recycled water system from the source to the application or receiving environments
- periodically review the recycled water system analysis.

Review of the recycled water system is undertaken as part of the risk assessment review process. Section 2.2 of the Risk Assessment: Hoxton Park Recycled Water Scheme Briefing Paper (March 2021) was provided as evidence of this review and includes a flow diagram and process description from source to end users consistent with the work instruction (D0000685).

The risk assessment workshop team is shown in Table 3.1 of the Risk Assessment Report Hoxton Park Recycled Water Scheme (July 2021). The team includes Sydney Water operations, project management and customer representatives as well as end users and a representative from NSW Health consistent with the SOP (D0001684). An attendance report from a video conference is attached as an appendix to the risk assessment report.

Assessment of water quality data

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to:

- assemble historical data about sewage, greywater or stormwater quality, as well as data from treatment plants and of recycled water supplied to users; identify gaps and assess reliability of data
- assess data (using tools such as control charts and trends analysis), to identify trends and potential problems.

Assessment of historical data is undertaken as part of the detailed recycled water quality risk assessment reviews. Hoxton Park risk assessments report were provided as evidence. The reports included an analysis of 10 years of influent data and effluent data. A detailed sampling program was also undertaken of microbial indicators to test log reduction value performance.

Hazard identification and risk assessment

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to:

- define the approach to hazard identification and risk assessment, considering both public and ecological health
- periodically review and update the hazard identification and risk assessment to incorporate any changes
- identify and document hazards and hazardous events for each component of the recycled water system
- estimate the level of risk for each identified hazard or hazardous event
- consider inadvertent and unauthorised use or discharge
- determine significant risks and document priorities for risk management
- evaluate the major sources of uncertainty associated with each hazard and hazardous event and consider actions to reduce uncertainty, apart from minor shortcomings identified with inconsistencies across risk documentation.

Hoxton Park risk assessment report was provided as evidence of detailed risk assessments undertaken in the audit period. The methodology used was consistent with the Recycled Water Risk Assessment Workshop SOP (D0001681). Uncertainty was considered as part of the risk assessment and documented in the risk column 'Risk comment - certainty of control'. The current Corporate Risk Matrix (800991) and Recycled Water Hazard and Risk Library (D0001682) were used and referenced in the risk reports.

A copy of the KnowRisk risk register report for Liverpool WRP was provided and showed that the risks for recycled water were reviewed during the audit period. The controls shown in this report were consistent with the risk register in the Liverpool RWQMP and the status of these controls was recorded as existing or complete. The reviewed date was 30/6/21 as risks are reviewed on a monthly basis and marked complete at the end of the year.

Element 3 Preventive measures for recycled water management

Preventive measures and multiple barriers

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to identify existing preventive measures system-wide for each significant hazard or hazardous event, and estimate the residual risk, identify alternative or additional preventive measures that are required to ensure risks are reduced to acceptable levels and document the preventive measures and strategies, addressing each significant risk.

The risk register for Liverpool WRP was provided as evidence. Residual risk was identified in the risk assessment and additional preventive measures identified.

Sample preventative measures documented in the Recycled Water Quality Management Plan for Liverpool WRP (WQ0003) were tested during the virtual-site visit and found to match the RWQMP.

The treatment processes were consistent with the Liverpool WRP – Plant Operations Manual (D0001291, v1, 30/9/21) and the flow diagram in the RWQMS.

Critical control points

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to assess preventive measures throughout the recycled water system to identify critical control points, establish mechanisms for operational control and document the critical control points, critical limits and target criteria.

Critical control points (CCP) were demonstrated on the SCADA system during the site visit of Liverpool. The CCPs were consistent with the RWQMP and the operator was unable to change the setpoints to outside the critical limits.

During the site visit, signage was sighted on each CCP monitoring point with the critical limits. These signs however were made from laminated paper in an outdoor environment and would require regular replacement to remain legible.

Critical control point data for free chlorine residual was provided as a SCADA screenshot for a sample period (May 2021). SCADA shows valves on supply to Warwick Farm Racecourse closed when the free chlorine drops below 0.88 mg/L. The valve to Liverpool Golf Course was closed during the period so this interlock could not be checked.

Critical control point data for free chlorine residual was provided as a SCADA screenshot for a sample period (August 2020). SCADA shows the valve on supply to Liverpool Golf Course only opened when the ammonia was below 5 mg/L. The valve closed when the ammonia dropped below 5 mg/L. The valve to Warwick Farm Racecourse was closed during the period so this interlock could not be checked.

During the site visit the free chlorine residual was below the setpoint and the valves to both recycled water customers were closed and flow was observed to be diverted to the oxidation ponds.

Element 4 Operational procedures and process control

Operational procedures

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to:

- Identify procedures required for all processes and activities applied within the whole recycled water system (source to use)
- document all procedures and compile into an operations manual.

The process units covered in the Liverpool WRP – Plant Operations Manual (D0001291) were consistent with those viewed during the site inspection.

Completed logsheets were provided for Liverpool WRP process monitoring (7/12/20 to 11/12/20) and were consistent with the Process Monitoring Workflow SOP (LVTP0014).

Operational monitoring

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to develop monitoring protocols for operational performance of the recycled water supply system, including the selection of operational parameters and criteria, and the routine analysis of results and to document monitoring protocols into an operational monitoring plan.

Operational WRP monitoring is documented through daily inspection sheets, lab analysis records and SCADA records. We were provided with Liverpool WRP process monitoring log sheets for December 2020 and May 2021, plant and equipment monitoring checklist for 7 to 11 December 2020 and viewed SCADA records as evidence during the site visit.

We tested the Process Monitoring Workflow SOP (LVTP0014) against the December 2020 and May 2021 Liverpool WRP process monitoring log sheets. the parameter, locations and frequencies undertaken are consistent with the schedule requirements.

During the site visit of Liverpool WRP, it was noted that the pH buffer solutions used for calibration of the handheld instrument were marked with the date the bottles were opened. Sydney Water staff however were not able to describe how long after this date disposal the reagents is required. There is an opportunity for Sydney Water operational staff to clearly understand when disposal of analysis reagents is required (OFI 4.2.3-2).

Operational corrections

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to establish and document procedures for corrective action where operational parameters are not met and establish rapid communication systems to deal with unexpected events.

Sydney Water advised that there were no CCP exceedances in the audit period for Liverpool. SCADA was viewed during the site visit and no exceedances were noted for the data sampled; refer to Element 3 critical control points for details. Weekly Georges River Hub meeting agendas for 23/10/20 and 29/1/21 were provided and both agenda have items for discussion on recycled water monitoring.

Equipment capability and maintenance

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to:

- ensure that equipment performs adequately and provides sufficient flexibility and process control
- establish a program for regular inspection and maintenance of all equipment, including monitoring equipment.

Maintenance records were provided for the Liverpool WRP, for monthly and six-monthly maintenance as well as condition based for orders for CCP instruments. All work orders raised during the audit period were closed.

Plant and equipment logsheets for 7 to 11 December 2020 were provided as evidence of daily instrument inspection and checks. Logsheets were consistent with Condition Monitoring and Maintenance Workflow SOP (LVTP0056, v8, dated 17/11/2016).

Training records were provided for Condition Monitoring and Maintenance Workflow SOP (LVTP0056) on 5/7/21 (outside audit period) and Laboratory and Portable Equipment Records SOP (LVTP0067) on 26/3/21.

During the site visit, the calibration stickers on the handheld and bench instruments were observed and none were overdue.

Materials and chemicals

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to:

- ensure that only approved materials and chemicals are used
- establish documented procedures for evaluating chemicals, materials and suppliers.

A certificate of analysis was provided for sodium hypochlorite (28/4/2021). This was consistent with the requirement set in the technical specification for sodium hypochlorite and the analysis required in the Wastewater and Recycled Water Bulk Chemical Delivery SOP (D0001388, v1, dated March 2020).

Element 5 Verification of recycled water quality and environmental performance

Recycled water quality monitoring

Except for a minor shortcoming found where the reported number of required samples collected was less than required in the monitoring plan, Sydney Water has provided sufficient evidence to demonstrate implementation of the requirements of their RWQMS to establish and document a sampling plan for each characteristic in the distribution system and water as supplied to the customer (including the location and frequency of sampling) and ensure monitoring data are representative and reliable.

The Liverpool Irrigation Scheme Monthly Reports (July 2020 – June 2021) show the results of the current month's analysis and a summary of the year to date. Parameters that are outside the guideline values are highlighted. These exceedances are discussed in the Quarterly Water Quality Monitoring Reports for NSW Health and reported to the

end users in the Irrigation Scheme Monthly Reports. The required monitoring for Liverpool RWP compared with the monitoring recorded in the monthly irrigation scheme reports for 2020-21 is shown in Table 2-17.

Not all of the parameters are shown in the monthly irrigation scheme reports and the weekly analysis has not been reported for 52 weeks of the year. The monthly reports show the expected weekly samples also less than 52 and no evidence was provided to explain this discrepancy.

The discrepancy in the compliance and health monitoring requirements is considered minor in the amount of sampling and analysis undertaken by Sydney Water. While there was no turbidity, free and total chlorine reported to in the irrigation scheme monthly reports evidence was provided that this is being monitored with online instruments or in the Liverpool WRP laboratory at or greater than the frequency required in the monitoring plan.

The discrepancies in the environmental monitoring are also considered minor (e.g NOx is a component of total nitrogen) or are required to be monitored as part of the Environment Protection Licence (e.g. heavy metals and pesticides).

Table 2-17. Compliance with Recycled Water Monitoring Plan for Liverpool WRP

Characteristic	Parameter	Samples required	Samples reported
Compliance	E. coli	52	49
Operational (Health)	pH	52	49
	Turbidity	52	Nil
	$CBOD_5$	52	48
	Suspended solids	52	48
	Total chlorine	26	29
	Free chlorine (HACH)	52	Nil
	Total chlorine (HACH)	52	Nil
Operational (Environmental)	Total dissolved solids	4	4
	Conductivity	4	4
	Alkalinity	4	4
	Chloride	12	12
	Sulphate	4	4
	NOx	12	Nil
	Ammonia	12	57
	Total nitrogen	12	12
	Total phosphorus	12	12
	Ortho-phosphorus	12	Nil
	Oil & Grease	12	12
	Filterable Potassium	12	12
	Filterable Sodium	12	12

Characteristic	Parameter	Samples required	Samples reported
	Filterable Calcium	12	12
	Filterable Magnesium	12	12
	SARF	12	12
	Fluoride	1	1
	Aluminium	52	47
	Arsenic	12	12
	Beryllium	12	12
	Boron	12	12
	Cadmium	12	12
	Chromium	12	12
	Cobalt	12	12
	Copper	12	12
	Iron	12	12
	Lead	12	12
	Lithium	12	12
	Manganese	12	12
	Mercury	12	21
	Molybdenum	12	12
	Nickel	12	12
	Selenium	12	12
	Uranium	12	Nil
	Vanadium	12	Nil
	Zinc	12	12
	Surfactants	12	Nil
	Phenol	12	Nil
	Herbicides*	1	1
	Organochlorine pesticides (total)	1	Nil
	Organophosphate pesticides (total)	1	Nil

Application site and receiving environment monitoring

Sydney Water has provided sufficient evidence to demonstrate implementation of its Recycled Water Quality Management System to determine the characteristics to be monitored and the points at which monitoring will be undertaken.

Quarterly irrigation water quality reports are provided to each customer. Evidence was provided of the Liverpool Irrigation Water Quarterly Report, (First Quarter, 1/7/2020-31/8/2020). Refer to the discussion under Clause 10.2 for issues noted in the irrigation reports.

Recycled water customer meeting form for Warwick Farm Racecourse (26 November 2020) and Liverpool Golf Club (9 July 2021) was provided as evidence of the communication of responsibility of end user monitoring, with the item included as an agenda item.

Documentation and reliability

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component (establish and document a sampling plan for each characteristic, including the location and frequency of sampling, ensuring that monitoring data is representative and reliable) as discussed under Element 5, Recycled Water Monitoring section above.

Satisfaction of users of recycled water

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component to establish an inquiry and response program for users of recycled water, including appropriate training of people responsible for the program.

Sydney Water advised there have been no customer concerns raised with the Business Customer Representative regarding the quality of recycled water from Liverpool WRP throughout the audit period.

Short-term evaluation of results

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component to establish procedures for the short-term review of monitoring data and satisfaction of users of recycled water and develop reporting mechanisms internally and externally, where required.

An example daily exception report from Labware system (19/10/2020) was provided as evidence of internal reporting mechanisms. Evidence of external reporting of monitoring data and consumer satisfactions was provided:

- JOG Meeting minutes (12/5/2021)
- Quarterly Recycled Water Quality Monitoring Report for NSW Health (all four quarters for 2020-21)
- Annual Recycled Water Quality Compliance and Performance Report, 2020-21.

Corrective responses

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component:

- establish and document procedures for corrective responses to nonconformance or feedback from users of recycled water
- establish rapid communication systems to deal with unexpected events.

Refer to discussion above in Short-term evaluation of results.

Element 6 Management of incidents and emergencies

Communication

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component:

- define communication protocols with the involvement of relevant agencies and prepare a contact list of key people, agencies and stakeholders
- develop a public and media communications strategy.

The Georges River Hub Contact List (D001910, 23/11/2020) was provided and included contacts for all key stakeholders including regulators and recycled water customers.

The minutes of the Second Quarter meeting of the Joint Operations Group on 12/5/2021 was provided as evidence of regular communication with NSW Health on recycled water including discussion on recycled water quality exceptions, incidents and exercises.

Incident and emergency response protocols

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements to define potential incidents and emergencies and document procedures and response plans with the involvement of relevant agencies, train employees and regularly test emergency response plans and investigate any incidents or emergencies and revise protocols as necessary.

Sydney Water provided documentation of an incident where a cross connection between potable and recycled water was found on customer's property within the Rouse Hill recycled water scheme. The timeline and correspondence were verified during the interviews.

While customer plumbing connections are not within Sydney Water's regulatory control, one of their maintenance staff noticed the cross connection at 10:10 am on 22/8/20. Sydney Water immediately notified the property and removed the cross connection. NSW Health were notified verbally on 22/8/20 at 12:50 pm. The matter was referred to Fair Trading NSW on 24/8/20.

During discussion on this incident, Sydney Water noted that while Fair Trading NSW inspect and certify the property connections for potable and recycled water when initially constructed, it is the responsibility of plumbers undertaking maintenance or modifications to ensure compliance with NSW Plumbing and Drainage Act. Sydney Water must therefore rely on lower pressure in the recycled water system than the potable system and water quality monitoring to detect cross connections. Sydney Water advised that NSW Health been involved in discussions with Sydney Water and Fair Trading NSW that was outside the reporting period.

There is an opportunity to clearly define how customer plumbing compliance is regulated following the initial inspection by Fair Work NSW (OFI 4.2.3-1)

Element 10 Documentation and reporting

Management of documentation and records

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component:

- document information pertinent to all aspects of recycled water quality management, and develop a document-control system to ensure current versions are in use
- establish a records-management system and ensure that employees are trained to complete records
- periodically review documentation and revise as necessary.

Sydney Water has a certified quality system to ISO 9001:2015. The Certificate of Registration shows registration was renewed on 29 April 2021. During the interviews and site visits, Sydney Water staff were able to locate and open documentation on BMIS.

During the interviews, Sydney Water was able to show the planned review date for Liverpool RWP documentation. There was no documentation that was past its review date.

Reporting

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component:

- establish procedures for effective internal and external reporting
- produce an annual report aimed at users of recycled water, regulatory authorities and stakeholders.

Sydney Water produced the reports required under their RWQMS and the IPART Reporting Manual. There were some discrepancies between the Quarterly Recycled Water Quality Monitoring Reports for NSW Health compared with the 2020-21 Liverpool Irrigation Scheme Monthly Reports. These discrepancies were discussed and are graded at Clause 10.2.

Element 11 Evaluation and audit

Long-term evaluation of results

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component:

- collect and evaluate long-term data to assess performance and identify problems
- document and report results.

The Quarterly Recycled Water Monitoring Reports for NSW Health (1st, 2nd, 3rd and 4th Quarter) provided evidence of the 12-month rolling average analysis of the verification data. Findings and any associated actions are presented at each Joint Operational Group meeting.

The Hoxton Park Risk Assessment Report, undertaken in the audit period, included the statistical analysis and trending of 10 years of water quality data against the AGWR microbiological, long-term value and short-term value. The evaluation of results focuses on verification results rather than CCPs.

Audit of recycled water quality management

We found minor shortcomings for this element with no audits in the audit period focusing on recycled water systems (as identified last year and covered by Recommendation 2020:13) This recommendation is due for completion on 31 December 2021 and Sydney Water have audits scheduled for the first and second quarter of 2021/22.

Sydney Water conducted four audits of the WRPs in the audit period. The completed audit summary for Winmalee was provided as evidence of audit documentation. The audit was conducted on 24/11/21. The audit did not consider compliance with the RWQMP or the AGWR. Inclusion of compliance with RWQMP and RWMM in regular audits was raised in the 2019-20 audit and is discussed in Recommendation 2020-13. While there is progress against this recommendation it is a shortcoming that no recycled water quality system audits were undertaken in 2020-21.

None of the audits of recycled water plants in 2020-21 had non-conformances or recommendations and it was therefore not possible to review documentation and progress on actions.

Completed audit reports are sent to the relevant business manager and entered into BMIS.

Element 12 Review and continuous improvement

Reviewed by senior management

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirement for senior management review of the effectiveness of the management system and evaluate the need for change.

The Management Systems presentation from 15 November 2020 was provided as evidence that the senior executive has reviewed the effectiveness of the recycled water quality management system and evaluated the need for change. The attendees at the management meeting included General Managers, Heads of Department (including Risk) and relevant managers. The reporting for recycled water focused on verification compliance. It did not report of on Sydney Water's preventive approach to water quality management through the CCPs or compliance with the RWMM or the scheme RWQMPs. The Management Review Report 2019-2020 (5/11/20) similarly only focuses on verification compliance, incidents and recycled water quality exceedances

Recycled water quality management improvement plan

Sydney Water has provided sufficient evidence to demonstrate implementation of the AGWR requirements for this component:

- developed a recycled water quality management improvement plan

- ensure that the plan is communicated and implemented, and that improvements are monitored for effectiveness.

The Recycled Water Improvement Register from August 2021 was provided as evidence. Action items from the recycled water risk assessments are transferred to this register if they are significant or apply to more than one site. Plant improvements are added to the relevant Hub Master Action List.

The Georges River Hub Master Action List was provided though no actions from recycled water risk assessment or audits were found and it was therefore not possible to verify short-term actions are added to this list.

The development of the Recycled Water Dashboard (as part of the improvement plan) in the improvement plan is strong evidence that Sydney Water implements and communicates its improvements. Sydney Water provided evidence that the plan was presented to NSW Health during the quarterly JOG meetings.

Sydney Water closed off 5 items on the improvement plan in 2020-21 and added no actions. There 19 actions due for completion in 2020-21 which have been marked as overdue. All the overdue actions have progress comments and revised due dates. No actions were added during 2020-21 due to delays in risk reviews due to COVID restrictions. There were no actions from audits as the RWQMP was not audited during the WRP audits as discussed above.

The action list includes a column for progress update to each quarterly JOG meeting. Where actions are overdue, a revised date agreed by the JOG was entered in the comments for that meeting before the due date was revised.

Recommendation

Recommendation 4.2.3-1: We recommend by 31 March 2022, Sydney Water update Irrigation Scheme Monthly Reports to include explanations when fewer samples are required in the period than the frequency in the monitoring plan (e.g. if there are four weeks in the month why are less than four weekly samples required).

Opportunities for improvement

OFI 4.2.3-1 Develop and train relevant staff in procedures for disposal of each reagent used for analysis or instrument calibration at their recycled water sites when outside the expiry date or have been opened for longer than the suppliers' recommendation.

OFI 4.2.3-2 Ensure that management systems presentation to senior executive incorporate Sydney Water's preventive approach to water quality management through the CCPs, compliance with the RWMM and scheme RWQMPs

Clause 4.3 – Fluoridation

Clause 4.3.1

Table 2-18. Clause 4.3.1 compliance grade

Subclause	Requirement	Compliance grade
4.3.1	Sydney Water must comply with the Fluoridation Code and any requirements for fluoridation specified by NSW Health.	Compliant

Risk	Target for full compliance
Non-compliance with this clause poses a risk that Sydney Water is not adequately managing its fluoridation systems to best minimise risk of fluoride underdosing or overdosing.	Fluoridation systems and documentation that comply with the NSW Health Fluoridation Code of Practice (2018).

Summary of reasons for grade

Sydney Water has demonstrated the requirements of the NSW Health Fluoridation Code of Practice (2018) (the Code).

The residuals lagoon at Macarthur WFP is eventually returned to the head of the works under the current plant operation. Sydney Water is planning an upgrade to divert fluoride room wastewater to a fluoride holding tank which can be pumped out or returned to the head of the works. Through the fluoride dilution calculations and online treated water fluoride monitoring with process shutdown on high fluoride, Sydney Water have demonstrated that the risk of fluoride overdose is controlled.

This clause is graded Compliant.

Discussion and notes

Fluoridation is carried out by Sydney Water at all their WFPs. Compliance with each chapter of the Code was audited. Findings against each chapter are discussed below.

During the audit, we focused on documentation for Macarthur and North Richmond WFPs provided as evidence.

Application and approval to fluoridate

No modifications were made to the Macarthur and North Richmond fluoridation plants during the period 1 July 2020 to 30 June 2021. The process for plant modifications was discussed and staff indicated that Sydney Water operated plants follow the Sydney Water Change Management Procedure. This document and an example of it filled in for the Nepean WFP flow switch upgrade (13/7/2020) was sighted during the interview. The change management procedure is a standard form for any modification or upgrade and includes consideration of reason for change, alternatives and risk assessment.

There are proposed system changes at the Macarthur WFP fluoridation plant. As this plant is operated by TRILITY it does not follow the Sydney Water Change Management Procedure.

The process that is being carried out at Macarthur WFP has been endorsed by NSW Health, and has so far included a Failure Mode Effects and Criticality Analysis (FMECA) carried out by TRILITY and a high-level design review meeting reviewing the outcomes for the FMECA and other considerations which included NSW Health. The demonstrated review process for the stage of design is appropriate and in line with the Fluoridation Code of Practice.

Sydney Water has provided sufficient evidence to demonstrate that controls are in place to prevent plant modifications from degrading the risk control measures in their fluoridation plants.

Design controls for fluoridation facilities

The Macarthur and North Richmond fluoridation systems were not modified during the reporting period. Planning for an upgrade to the Macarthur fluoridation plant is underway, details of this process is included above.

During the virtual site visit of Macarthur WFP, the relevant design controls were observed including that the room did not encourage powder build up with elevated 25 kg bags and a drainable floor and chemical storage conditions were observed as acceptable.

The drain from the fluoride room goes to the residual lagoons. The supernatant from these lagoons is eventually returned the head of the plant.

The fluoridation code has the following minimum standard:

"5.1.5.10 Fluoride shall not be allowed to flow to lagoons where supernatant is returned to the head of the works."

Clause 5.1.5.10 supports the following outcome:

"5.1.5 The design of the fluoridation plant shall provide a safe working environment and facilitate safe working practices to protect both plant operations staff and the public."

We take the intent of clauses 5.1.5.10 and 5.1.5 of the fluoride code to be that there should be design controls for any recycled streams to limit treated water leaving the plant above 1.5 mg/L.

Sydney Water demonstrated that during the audit period, automatic shut down on the upper Fluoridation CCP limit (1.4 mg/L) was in place and that supernatant return was limited to 10% of the total flow. They also provided evidence of the dilution of the fluoride waste water in the existing system. The dilution calculations demonstrated that in the event that the entire fluoride saturator was drained and returned to the head of the works, there would be minimal impact on the treated water fluoride concentration. With these controls in place, the risk of overdose through highly fluoridated supernatant return is controlled.

There are plans to install a new holding tank to collect spills and hose down water from the drain of the fluoridation room. The holding tank will have the option of returning water to the head of works via the wash water holding tank and supernatant in a similar way to the existing residuals lagoon return design or be manually pumped out and water disposed offsite. The proposed design with fluoridated supernatant return has

been risk assessed with key controls identified following the audit period (Fluoride Upgrade FMECA 031121 (working).xlsx). The upgrade project is currently in the planning stage.

Through the fluoride dilution calculations and online treated water fluoride monitoring with process shutdown on high fluoride, Sydney Water have demonstrated that they meet the objective of clause 5.1.5 in the Fluoridation Code of Practice.

Occupational health and safety

No WHS issues were observed during the virtual site tour of Macarthur WFP fluoridation plant. The following PPE was observed:

- particulate respirator used by operating staff
- chemical gloves
- chemical goggles
- safety footwear or safety gumboots
- overalls
- station for handwashing
- the fluoridation room was secure and locked with only qualified operators allowed access
- fluoride hazard signs were appropriately used
- the dust extractor was observed as appropriately located and functional
- pipes transporting fluoride solution were coloured magenta

Environmental safety

The Macarthur WFP fluoridation room minimises fluoride powder escape into the environment. The room's structure is sound with no open windows or cracks in the floor. A pallet worth of used sodium flourosilicate powder bags are wrapped in plastic and stored in a dedicated bin until they are returned to the supplier.

Control of fluoridating agent

The fluoridation chemical procurement process at Macarthur WFP adequately manages chemical quality, WHS and environmental risk, through appropriate ordering and loading procedures. The Sodium Silico Fluoride Specification Sheet (v4, dated 25/2/2021) was sighted and found to be appropriate.

Three months of sodium fluorosilicate does not fit within the fluoridation room and the required storage is split between onsite and at the chemical suppliers in Minto, approximately 10 km away. NSW Health has given approval for this arrangement.

Measurement of fluoride in the treated water

Reticulation monitoring data was sighted with evidence of sample locations rotating. Sample schedules are assigned at the beginning of the year to ensure all sites are visited evenly.

Fluoride monitoring results are recorded on a monitoring sheet which is scanned and stored online and entered into an excel spreadsheet. The results from the excel spreadsheet are compiled by the monitoring, design and reporting team for all systems

in a spreadsheet and emailed to NSW Health on a monthly basis. The April 2021 report and email were sighted during the audit interviews. The report was submitted within the required 14 days following the end of the month. Fluoride is also monitored online and results are stored in SCADA. TRILITY uses an automatic mass balance spreadsheet to verify their daily fluoride calculations at the Macarthur WFP.

The Macarthur WFP laboratory area was inspected during the virtual site visit and found to have adequate bench area, appropriate use of standards including 1.0 mg/L for calibration checks and up to date SOPs that captured the required methodology with evidence of staff training.

Plant operation and process control

Macarthur achieved the target treated water fluoride concentration of between 0.9 mg/L and 1.12 mg/L for 95% of results with a maximum result of 1.17 mg/L, North Richmond WFP achieved 100% of results between 0.9 mg/L and 1.1 mg/L. Daily plant grab samples and twice weekly reticulation samples were sighted and results were all compliant from Macarthur WFP and the North Richmond WFP systems.

Procedures that were used for the Macarthur and North Richmond fluoridation system during the period 1 July 2020 to 30 June 2021 cover lab analysis and plant operation. Operator SOP training is tracked using Compass which was sighted during the interviews.

There were no incidents relating to fluoride overdose at any of the Sydney Water WFPs. The fluoridation systems in Nepean WFP and Orchard Hills WFP were taken offline for maintenance from 20-30/7/20. The SWIRL report and Form 5 for the Orchard Hills WFP which was submitted to NSW Health on 21/7/20 was sighted.

Sydney Water have a Fluoride Overdose Response Plan which is part of Sydney Water's Drinking Water Event Management procedure (WPIMS5228, 15/6/2021). This plan includes liaison with NSW Health. Additional site emergency plans for Macarthur WFP were also sighted.

Reporting requirements

Routine fluoride monitoring results (Form 3 and 4) are included in the fluoride monitoring spreadsheet that is sent to NSW Health on a monthly basis. Evidence was provided to demonstrate that daily treated water fluoride concentration results for April 2021 for the nine plants had been provided to NSW Health on 9/5/2020.

There were no fluoride exceptions that required reporting in 2020-21. Evidence was sighted of Form 5 being submitted to NSW Health from Orchard Hills WFP when the fluoride system was taken offline for maintenance work.

Operator training and qualification

The certificates of three qualified operators at North Richmond WFP and eight operators at the Macarthur WFP were sighted. These satisfy the requirement for a minimum of two trained staff at each plant. New operators receive training at the WFP under the supervision of a trained operator before receiving their formal fluoride

certification. Training is tracked using Compass and scanned forms of the training attendance sheets are scanned and stored digitally. The Nepean WFP Critical Instrument Wis (work instructions) training record sheet was sighted as evidence of training records from within the audit period.

When SOPs are updated, operators are part of the review process and once the document has been updated, they receive formal training in the updated document.

Records keeping and availability

Sydney Water maintains water monitoring records in SCADA. The key records corresponding to the information recorded on Forms 3 and 4 are stored in electronic form in a spreadsheet.

Quality assurance and auditing

The Sydney Water fluoridation plants are audited according to a risk based schedule. Sydney Water and NSW Health held a risk evaluation workshop to prioritise and schedule the fluoridation plants to be audited in 2019, 2020 and 2021 (later delayed to 2022 due to COVID). Following the completion of this schedule another similar workshop will be held to reprioritise and reschedule the audits for the following years.

Macarthur WFP was most recently audited in 2019. North Richmond WFP is scheduled to be audited in 2022.

TRILITY also complete 3-4 yearly internal systems and procedural audits as part of their operation of the Macarthur WFP. The scope of this audit changes but can include the fluoridation plant. These audits run on a separate schedule to the SW audits.

Following the completion of a Sydney Water internal audit, the actions from the audits are put into a fluoride implementation plan which includes timelines agreed with NSW Health and the auditors. Progress on the fluoride implementation plan is reported quarterly to NSW Health in the JOG meeting.

Recommendation

No recommendations were made.

Opportunities for improvement

No opportunities for improvement are identified

Clause 5.1 – Water Continuity Standard

Clause 5.1.1

Table 2-19. Clause 5.1.1 compliance grade

Subclause	Requirement	Compliance grade
5.1.1	Sydney Water must ensure that, in each financial year, at least 9,800 Properties per 10,000 Properties (in respect of which Sydney Water provides a Drinking Water supply service) receive a Drinking Water supply service unaffected by an Unplanned Water Interruption (the Water Continuity Standard).	Compliant

Risk	Target for full compliance
If more properties experience unplanned water interruptions than the standard, customers will have not received the level of service they have paid for and there may be public health impacts.	To achieve compliance, it must be demonstrated that at least 9,800 properties per 10,000 properties receive supply unaffected by an unplanned interruption

Summary of reasons for grade

In 2020-21, there were 39,900 properties impacted by an Unplanned Water Interruption. This equates to 9,808 properties per 10,000 properties unaffected by an Unplanned Water Interruption, which is above the minimum standard of 9,800 properties per 10,000 properties. This is an improvement over 2019-20, where 9,736 properties per 10,000 properties were unaffected by an Unplanned Water Interruption.

While Sydney Water has met the Water Continuity Standard, the 39,900 properties impacted by an Unplanned Water Interruption in 2020-21 is above the optimal level (33,299 properties) and lower tolerance band (24,974 properties).

This clause is Compliant.

Discussion and notes

This clause requires that Sydney Water ensure that, in each financial year, at least 9,800 properties per 10,000 properties (in respect of which Sydney Water provides a drinking water supply service) receive a drinking water supply service unaffected by an Unplanned Water Interruption. This is known as the Water Continuity Standard.

Under Sydney Water's operating licence, an Unplanned Water Interruption is defined as an event where:

- The supply of drinking water at the first cold water tap of a property is interrupted without the customer or consumer having received prior notice of that interruption from Sydney Water
- It takes more than five continuous hours for normal supply of drinking water to be restored to the property.

Process

Data for water continuity events is initially logged in two separate systems; service faults and network events are logged in Maximo, whereas service requests and customer

complaints are logged in SAP. Maximo is Sydney Water's computerised maintenance management system. Any work orders resulting from service requests and customer complaints are then logged in Maximo. The majority of work orders are serviced by Sydney Water's Network Team, with contractors only called in for specialist work requests. Field data from the Network Team is logged in real time using Panasonic Tough Books that are linked to Maximo. The location of the Network Team is also tracked via the Global Positioning System by the field supervisor.

As part of this process, field crews are able to undertake a network trace by using a geographic information system application, Tensing, to identify the properties affected by the unplanned water interruption. The affected properties are then sent to the billing system to be captured with the associated work order number.

Sydney Water has in place Maintenance Crew ClickMobile Work Instructions (document number D0001781, Version 2). These work instructions document the procedure to log data in the field, from the start to the end of the field crew member's shift. The work instructions were last issued on 30 July 2020.

Reporting

The data captured for unplanned water interruptions is reported monthly from Sydney Water's Business Intelligence system, which uses a reporting query that interrogates work order data in Maximo. This query uses relevant fields from the Maximo work order, including problem type, task code, remedy code, parent work order, reported time, actual finish time, asset number, proposed water off/on time and actual water off/on time, to identify unplanned water interruptions. The query contains checks for data completion.

Sydney Water has developed a Performance Indicator Sheet for the water continuity standard (SWIM 1278037, Version 1). This performance indicator sheet documents the indicator definition, assigned roles (indicator owner, data provider, analysis/commentary provider, reporting manager and reporting coordinator) and report details (title, report location, screenshots of results, and query details). The performance indicator sheet was last issued on 1 August 2021. We observed that the definitions contained in the performance indicator sheet are consistent with those in Sydney Water's operating licence.

Quality assurance

In addition to the data completion checks contained in the reporting query, Sydney Water advised that it runs monthly quality assurance reports and conducts six-monthly peer reviews on the reported data. As an example of the quality assurance performed, Sydney Water provided the following:

- Customer Delivery Performance Dashboard Report for February 2021. In this report, it is stated that extensive data cleansing was performed, resulting in an increase in the reported number of properties affected by an Unplanned Water Interruption in December 2020

- Maximo BI - Weekly Data Quality Report 15022021.xlsx. This spreadsheet summarises the results of the weekly quality assurance check performed on 15 February 2021 in relation to various system performance standard data
- Maximo BI - Water Continuity Standard Data Quality 25082021.xlsx.

Calculations

Sydney Water advised that it analyses unplanned water interruption data on a monthly basis. This includes a forecast to the end of the year, based on historical data, to track and estimate performance against the water continuity standard.

As evidence, Sydney Water provided to us:

- A schedule of unplanned water interruptions in 2020-21 (Maximo BI - All Unplanned Water Interruption 25082021.xlsx), listing, for each unplanned water interruption, fields such as the work order number, interruption type, problem type, reported date and time, actual water off date and time, and restored date and time
- Network Performance Report as at June 2021
- Operating Licence 2019-2023 Compliance and Performance report: Performance Standards for Service Interruptions Report 2020-21.

If an unplanned water interruption is reported by a customer who has experienced a loss of water, the interruption is logged in Maximo with a problem type of "NW" ("no water"). Provided that the corresponding remedy code is not "RW-WR3I" or "RW-WR1P" ("Repair Main Tap" and "Shutdown/Recharge Watermain - For Other Service Provider", respectively), the duration of the interruption is measured as the difference between the reported date and time and the restored date and time. For all other interruptions, the duration is measured as the difference between the water off date and time and the restored date and time.

During the audit, we re-calculated the total number of properties impacted by an unplanned water interruption for more than five continuous hours in 2020-21. We based our calculation on the schedule of unplanned water interruptions in 2020-21. We confirmed the reported number of properties impacted by an unplanned water interruption for more than five continuous hours in 2020-21.

Data trailing

We selected a small sample of work orders from the schedule of unplanned water interruptions and trailed them into Maximo to review the event details. The work orders trailed were 82032657 and 82895209. We found that the information recorded in Maximo was consistent with that in the reporting schedule.

Recommendation

No recommendations were made

Opportunities for improvement

No opportunities for improvement were identified

Clause 5.1.4

Table 2-20. Clause 5.1.4 compliance grade

Subclause	Requirement	Compliance grade
5.1.4	Sydney Water must use the best available data (taking account of water pressure data, where available) to determine whether a Property has experienced an Unplanned Water Interruption.	Compliant

Risk	Target for full compliance
Failure to comply with this obligation means that there is a risk of reduced assurance that Sydney Water is meeting its obligations under Clause 5.1 – Water Continuity Standard and therefore providing a reliable service to customers	Sydney Water is able to demonstrate that the data that it is using to assess whether a property has experienced an unplanned interruption is the best available.

Summary of reasons for grade

Sydney Water had demonstrated that the data used in assessing whether a Property has experienced an Unplanned Water Interruption is the best available to it by sourcing information from its key business systems including the geographical information system, maintenance management system and SCADA system.

We have graded this clause as Compliant.

Discussion and notes

This clause requires that Sydney Water use the best available data (taking account of water pressure data, where available) to determine whether a property has experienced an Unplanned Water Interruption.

Sydney Water considers "best available data" to be data and information sourced from available systems such as Hydra/Spatial Hub, Maximo and IICATS. As such, Sydney Water uses a combination of these systems to determine if a fault can result in an unplanned water interruption.

An overview of how each of these systems is used to identify and record faults is outlined below:

- Hydra/Spatial Hub: Used to identify the area of a fault reported by a customer or member of the public
- Maximo:
  - Used to capture a fault reported by a customer or member of the public
  - Used to capture a fault identified from alarms
- IICATS: Used to identify probable unplanned water interruptions by using alarms of reservoir depletion, pump faults, or pressure drops that are outside alarm parameters in order to identify faults prior to these being reported by customers or members of the public.

After identifying and recording faults through the above systems, Sydney Water undertakes a Customer Impact Assessment to determine if a shutdown is required for repair. Based on the results of the Customer Impact Assessment and discussions with the field crew, Sydney Water determines the alternate supply arrangements required (i.e., rezoning) in order to reduce customer impacts.

Recommendation

No recommendations were made

Opportunities for improvement

No opportunities for improvement were identified

Clause 5.3 – Dry Weather Wastewater Overflow Standard

Clause 5.3.1

Table 2-21. Clause 5.3.1 compliance grade

Subclause	Requirement	Compliance grade
5.3.1	Sydney Water must ensure that, in each financial year, at least: a) 9,928 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding Public Properties) receive a sewerage service unaffected by an Uncontrolled Wastewater Overflow; and b) 9,999 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding Public Properties) receive a sewerage service affected by fewer than three Uncontrolled Wastewater Overflows, (the Dry Weather Wastewater Overflow Standard).	Compliant

Risk	Target for full compliance
If more properties experience Uncontrolled Wastewater Overflows than the standard, customers will have not received the level of service they have paid for and there may be public health impacts.	To achieve compliance, it must be demonstrated that at least 9,928 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding Public Properties) receive a sewerage service unaffected by an Uncontrolled Wastewater Overflow; and that at least 9,999 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding Public Properties) receive a sewerage service affected by fewer than three Uncontrolled Wastewater Overflows

Summary of reasons for grade

In 2020-21, there were 4,151 Properties (other than Public Properties) affected by a dry weather uncontrolled wastewater overflow. This equates to 9,979 Properties per 10,000 properties (excluding Public Properties) unaffected by a dry weather uncontrolled wastewater overflow, which is above the minimum standard of 9,928 Properties per 10,000 Properties. This is an improvement over 2019/20, where 9,965 Properties per 10,000 Properties (excluding Public Properties) were unaffected by a dry weather uncontrolled wastewater overflow.

In 2020-21, there were eight Properties (other than Public Properties) affected by three or more dry weather uncontrolled wastewater overflows. This equates to 9,999 properties per 10,000 properties (excluding Public Properties) unaffected by a dry weather uncontrolled wastewater overflow, which is equivalent to the minimum standard. This is an improvement over 2019-20, where 34 properties (other than Public Properties) were affected by three or more dry weather uncontrolled wastewater overflows.

This clause is graded Compliant.

Discussion and notes

This clause requires that Sydney Water ensure, in each financial year, at least:

- 9,928 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding public properties) receive a sewerage service unaffected by an uncontrolled wastewater overflow
- 9,999 Properties per 10,000 Properties (in respect of which Sydney Water provides a sewerage service but excluding public properties) receive a sewerage service affected by fewer than three uncontrolled wastewater overflows.

This is known as the dry weather wastewater overflow standard.

Process

Sydney Water has adopted the following definitions in relation to dry weather wastewater overflows:

- An uncontrolled dry weather wastewater overflow is a wastewater overflow occurring in dry weather that is not a controlled wastewater overflow
- A controlled wastewater overflow is a sewage overflow that is directed by Sydney Water via a designated structure to a predetermined location, such as a stormwater drainage system or waterway, in order to prevent overloaded or blocked sewers from discharging at sensitive locations, on private property or within buildings
- A dry weather overflow is an overflow that has been caused by an identified blockage in the sewerage system (e.g., tree root intrusion) or a system failure related to capacity when the catchment area has not been affected by rain
- A wet weather overflow is a hydraulic capacity issue in the network that is affected by rain
- An uncontrolled wastewater overflow will be taken to have commenced on the earlier of the following:
    - When a person notifies Sydney Water that a property (which may include a Public Property) has experienced a sewage overflow which Sydney Water confirms is an uncontrolled wastewater overflow
    - When Sydney Water's systems identify that a property (which may include a Public Property) has experienced an uncontrolled sewage overflow.
- Public Property is real property vested in or under the control of a Minister of the Crown or public authority, excluding so much of such real property as is leased, licensed or used for private purposes.
- Sydney Water advised that its systems identify the wastewater overflow category based on the overflow point. Sydney Water also advised that its civil staff are trained to be able to identify the different categories of wastewater overflows, with training modules maintained in Sydney Water's Compass system.

We note that there is potential ambiguity between Sydney Water's stated definition for a dry weather overflow and that set out in the Performance Indicator sheet. The Performance Indicator Sheet states that a dry weather overflow includes system failures

that are not related to capacity whereas the stated definition does not have this same explicit exclusion. There is an opportunity for improvement for Sydney Water to review its definition for dry weather overflows to ensure that it is not ambiguous and is consistent across relevant business processes.

Reporting

The data captured for dry weather wastewater overflows is reported monthly from Sydney Water's Business Intelligence system, which uses a reporting query that interrogates work order data in Maximo.

Sydney Water has developed a Performance Indicator Sheet for the dry weather wastewater overflow standard (SWIM 1278039, Version 1). This performance indicator sheet documents the indicator definition, assigned roles (indicator owner, data provider, analysis/commentary provider, reporting manager and reporting coordinator) and report details (title, report location, screenshots of results, and query details). We observed that the definitions contained in the performance indicator sheet are consistent with those in Sydney Water's operating licence.

Quality assurance

Sydney Water advised that the reported data is validated against its customer relationship management system, as well as Maximo, to identify and rectify any omitted Properties that are subject to an uncontrolled sewage overflow rebate.

As an example of the quality assurance performed, Sydney Water provided the following:

- Maximo BI - Weekly Data Quality Report 15022021.xlsx. This spreadsheet summarises the results of the weekly quality assurance check performed on 15 February 2021 in relation to various system performance standard data.

Calculations

Sydney Water advised that it analyses dry weather wastewater overflow data on a monthly basis. This includes a forecast to the end of the year, based on historical data, to track and estimate performance against the dry weather wastewater overflow standard.

As evidence, Sydney Water provided to us:

- a schedule of uncontrolled wastewater overflows in 2020-21 (Maximo BI - All Uncontrolled Wastewater Overflows Jobs 25082021.xlsx), listing, for each Property affected by a wastewater overflow, fields such as the property number, work order identifier, problem type code, remedy code, and year and month of the overflow
- Network Performance Report as at June 2021
- Operating Licence 2019-2023 Compliance and Performance report: Performance Standards for Service Interruptions Report 2020-21.

During the audit, we re-calculated the total number of properties affected by a dry weather wastewater overflow in 2020-21. We based our calculation on the schedule of uncontrolled wastewater overflows in 2020-21, filtered to display dry weather

wastewater overflows only. We confirmed the reported number of properties affected by a dry weather wastewater overflow in 2020-21. We also confirmed the reported number of properties affected by three or more dry weather wastewater overflows in 2020-21.

Data trailing

We selected a small sample of dry weather wastewater overflow work orders from the schedule of uncontrolled wastewater overflows and trailed them into Maximo to review the event details. The work orders trailed were 83230111 and 83570736. We found that the information recorded in Maximo was consistent with that in the reporting schedule.

Recommendation

No recommendations were made

Opportunities for improvement

OFI 5.3.1-1: There is an opportunity for improvement for Sydney Water to review its definition for dry weather overflows to ensure that it is not ambiguous and is consistent across relevant business processes.

Clause 5.5 – Asset Management

Clause 5.5.2

Table 2-22. Clause 5.5.2 compliance grade

Subclause	Requirement	Compliance grade
5.5.2	Sydney Water must ensure that the Asset Management System is fully implemented and that all relevant activities are carried out in accordance with the Asset Management System.	Non-compliant (material)

Risk	Target for full compliance
Assets are poorly managed leading to higher costs and failure to meet required service levels including public health and environmental protection.	Sufficient evidence that a Management System for assets is in place consistent with the standard and that it is maintained.

Summary of reasons for grade

The Asset Management System is applied across Sydney Water's large and varied asset base for the purpose of achieving the defined Asset Management Objectives. The Asset Management Policy plays an important role in the Asset Management System as it specifies guiding principles by which Sydney Water manages its assets. Sydney Water then has planning and execution processes that support these principles and to ultimately, achieve its Asset Management Objectives.

While it is evident that Sydney Water has in place considerable and mature processes for asset management, the management of the risk at Potts Hill reservoir arising from the potential ingress of contaminants into the failed roof and liner demonstrated that Sydney Water did not effectively implement its Asset Management System during the audit year and was therefore non-compliant with the requirements of this clause.

Specifically, Sydney Water did not follow the guiding principle in its Asset Management Policy that "assets be managed for the lowest life cycle cost to achieve the desired level of service at an acceptable risk" in managing the water quality risk at Potts Hill during the audit year. The guiding principle is operationalised through the risk management framework. Sydney Water's actions, which were not in accordance with its risk management approach include that

- It continued to accept an operational risk (in the interim until the liner would be replaced) that was high (and likely to be very high based on the November 2019 condition assessment) without considering further mitigation steps as it was obliged to do under the "priority for attention" matrix. There is no evidence that Sydney Water has sought to reduce this risk to a level that was as low as cost-effective.
- The annual operational risk assessments undertaken by Sydney Water did not include sufficient or appropriate measures for mitigating the water quality risk. The mitigation measures reflect business as usual and do not appear to recognise the increasing level of risk.

- Sydney Water did not prepare a risk mitigation plan that it had identified was required in the NABC

Sydney Water notes that it considers that it did identify, assess and implement mitigation measures but these were not well documented.

In assessing the materiality of the non-compliance, we have considered the impact of the non-compliance on Sydney Water's objectives. The relevant objective is the Asset Management Objective "to ensure key risks are understood and the appropriate controls to mitigate and adopt risks are in place". As detailed, there is little evidence available that Sydney Water implemented appropriate controls to manage the operational risk. There is a large population connected to the Potts Hill reservoir and the consequences of water quality risks can be substantial. We therefore conclude that the non-compliance is material.

We also identified that Sydney Water did not invite NSW Health to the Potts Hill project risk assessment, where public health risks were ranked. The need to invite NSW Health to risk assessments which consider public health risks was identified in the 2016-17 and 2020 audits and recommendations to address these findings were made (see also the discussion in clause 4.1.3). Therefore Sydney Water has not engaged with NSW Health as an important stakeholder in accordance with its stated stakeholder engagement processes. We concluded that this particular non-compliance was non-material as it had not led to Sydney Water being unable to meet its regulatory compliance obligations. Recommendation 4.1.3-1 is made to address this issue.

This overall clause is graded Non-compliant (material).

Discussion and notes

This clause requires that Sydney Water ensure that the asset management system is fully implemented and that all relevant activities are carried out in accordance with the asset management system.

Key changes in the audit period

In 2020-21, Sydney Water has commenced or completed the following key changes to its asset management system:

- Commencement of the development of One Management System. The One Management System is one of 19 strategic programs of work endorsed by the Board to support the delivery of the new Sydney Water Strategy. The One Management System aims to harmonise nine different management systems into a single management system. These nine management systems are:
  - Asset management system
  - Quality management system
  - Workplace health and safety management system
  - Environmental management system
  - NATA accreditation for laboratories
  - Drinking water quality management system
  - Recycled water quality management system

- Recovered products quality management system
- Cyber security management system

As part of the development of One Management System, Sydney Water has identified core elements that are common across all of its management systems, such as risk management and organisational capability.

To date, Sydney Water advised that it has undertaken the following activities to assist in establishing and implementing One Management System:

- Established a Management Systems custodian role to simplify and harmonise management systems into One Management System
- Received endorsement from the Executive on a high-level approach for the One Management System
- Received endorsement from the Executive on a detailed implementation plan for the One Management System. The implementation plan is governed by a One Management System Steering Group, which is chaired by the General Manager Government and Assurance. The One Management System Steering Group will govern all management systems and steer the overall One Management System program.
- Implemented integrated reporting for all management systems

Sydney Water further advised that it is currently implementing further improvements to the One Management System governance structure and scope.

As evidence of Sydney Water's plan to establish and implement One Management System, it provided to us a One Management System (1MS): High-Level Program Implementation Plan (Version 5). The implementation plan was last issued on 25 February 2021.

- Update of the Asset Management Policy, Strategic Asset Management Plan and Asset Management Objectives to align with the new Sydney Water Strategy. A summary of the Asset Management Objectives are also contained within the Strategic Asset Management Plan.
- Development of a high-level Asset Management Value Chain
- Development of an Asset Management Improvement Plan.

We note the following in regards to the updated Strategic Asset Management Plan, updated Asset Management Objectives and newly developed Asset Management Value Chain:

- The structure of the Strategic Asset Management Plan has been updated to more explicitly reflect the structure of ISO 55001.
- The supporting Asset Management Value Chain has been developed to align with the Institute of Asset Management's asset management framework, including identification of the teams responsible for each group of elements in the Institute of Asset Management's asset management framework. The Asset Management Value Chain also defines the responsible and accountable teams for each phase of the asset lifecycle (Strategy, Plan, Build, Operate and Maintain, Dispose, and Enablers/Support Processes). However, neither the Asset Management Value Chain

nor the Strategic Asset Management Plan appear to define the teams who are consulted and informed in each asset management activity. That is, neither document appears to define a Responsible, Accountable, Consulted and Informed (RACI) matrix.

- The Strategic Asset Management Plan has been updated to include greater context on the strategic planning undertaken within Sydney Water (Strategic Capital Investment Plan, 2020 – 2030 One Strategy and strategic plans)
- The Strategic Asset Management Plan has been updated to include a mapping of interfaces between Sydney Water's nine management systems
- The Asset Management Objectives are aligned with the strategic outcomes in the new Sydney Water Strategy. However, the Asset Management Objectives contained within the previous Strategic Asset Management Plan (document number D0000876, Version 3) delineated further alignment with not only the strategic objectives but also the corresponding corporate commitments and asset management principles. The corporate commitments were said to be derived based on a combination of Sydney Water's operating licence obligations, its external and internal challenges, and its aspirations. In contrast, in the updated Strategic Asset Management Plan, there appears to be less consideration of the organisation's regulatory context, constraints, challenges and opportunities.
- The Strategic Asset Management Plan includes a "Stakeholders" section (Section 4.4), which provides an overview of the annual Stakeholder Perception Survey and includes a "stakeholder wheel" (a list of stakeholders by category). However, the impact of stakeholder expectations on asset management requirements is not discussed. An overview of this link was included in the previous Strategic Asset Management Plan.
- Measures relating to each asset management objective are defined within the Strategic Asset Management Plan. Further information on these measures, the corresponding targets, and the teams responsible for monitoring performance against these measures is documented within the separate Asset Management Objectives document (document number D0000876.01, Version 1).

  However, it is not clear from the Strategic Asset Management Plan as to where asset performance measures are documented. Further, it is not clear how asset performance measures are derived. We note that the State of the Assets report summarises asset condition by asset class, resilience commentary by service, capacity and compliance by system (network or facility), and benchmarking analysis using the National Performance Indicators dataset. However, it does not appear to explicitly report on defined asset performance measures, nor does it indicate where these performance measures are documented.
- While the Strategic Asset Management Plan includes an "Assurance" section (within Section 14.3), this largely appears to outline high-level principles for assurance, rather than Sydney Water's specific approach, plans and activities to assure the compliance and effectiveness of its asset management system. Other than the annual management review, it is not clear from the Strategic Asset Management

Plan as to what assurance activities are undertaken by Sydney Water and where these activities (including findings and corrective actions) are documented.

Based on the above discussion, we consider that there are two opportunities for Sydney Water to consider for improvement of the Strategic Asset Management Plan:

- Assess whether the Strategic Asset Management Plan (and its associated artefacts), sufficiently details how the Asset Management Objectives consider the requirements of stakeholders and of other financial, technical, legal, regulatory and organisational requirements (OFI 5.5.1-2).
- Assess whether the Strategic Asset Management Plan (and its associated artefacts) sufficiently details the requirements and expectations of relevant stakeholders (OFI 5.5.1-3).

The current versions of the Strategic Asset Management Plan, Asset Management Policy and Asset Management Value Chain were issued in February 2021. We discuss the communication of these documents in the "Communication, consultation, training and awareness" section below. We discuss the Asset Management Improvement Plan in the "Implementation and monitoring" section below.

Communication, training and awareness

Sydney Water advised that communication on the asset management system occurs through the following mechanisms:

- Board and Executive meetings and papers on key matters
- Governance forums for Heads of Business and Level 4 managers:
  - Product and Asset Management Leadership Group
  - Product and Asset Management Forums
  - Process Councils
  - Other committees (e.g., One Management System Steering Committee).
- E-mails to relevant staff for key information.

As evidence of the communication activities undertaken, Sydney Water provided to us:

- Schedule of communication activities undertaken in 2020-21 (AMS Communication Activities 2020-21.xlsx)
- Terms of reference: Product and Asset Leadership Group (document number D0000676, Version 3). These were last issued on 27 May 2021.
- Terms of reference: Product and Asset Management Forum (Water, Water Resource Recovery and Asset) (document number D0000675, Version 2). These were last issued on 8 March 2021.
- PowerPoint presentation for a Board meeting held on Thursday, 17 December 2020 (Asset Strategy & Digitisation: Board, Item 2.5)
- Minutes from the Product and Asset Management Leadership Group meeting held on 24 February 2021

- E-mail from the Head of Infrastructure Investment and Asset Performance to managers on 1 March 2021, communicating the update of the Asset Management Policy, Strategic Asset Management Plan, Asset Management Objectives and Asset Management Value Chain.

Sydney Water has also provided to us a schedule of training and awareness activities undertaken in 2020-21 (AMS Training & Awareness Activities 2020-21.xlsx).

Stakeholder identification

As noted earlier, the Strategic Asset Management Plan provides an overview of the annual Stakeholder Perception Survey and includes a "stakeholder wheel". However, the impact of stakeholder expectations on asset management requirements is not discussed. During the audit, we requested further information on how stakeholders and their expectations are identified and how these are considered in setting asset management requirements and planning to meet these requirements.

In response to our request, Sydney Water provided to us its Policy and guidelines for community and stakeholder engagement. This document provides guidance to Sydney Water staff on undertaking community and stakeholder engagement and lists potential government stakeholders, community and other stakeholders, and Aboriginal stakeholders. The document also includes appendices on engagement activities in the Sydney Water asset planning process (Appendices 1 – 4). However, these appendices appear to focus on providing guidance at the project level, rather than at the asset management system, service or asset class level.

We consider that there is an opportunity for Sydney Water to review its approach to identifying stakeholder needs for the Asset Management System and determine whether the approach needs increased focus on business as usual requirements rather than stakeholder expectations for one-off projects (OFI 5.5.1-1).

We discuss below in this clause Sydney Water's approach to managing the Potts Hill reservoir as it approached the end of its useful life. NSW Health raised concern in its submission to this audit that it had not been invited to risk assessments relating to the Potts Hill reservoir roof tear and the further extension of the Sydney Desalination Plant operation. Reviewing the Policy and guidelines for community and stakeholder engagement and considering the importance of the works and associated risks arising from end of life of the Potts Hill reservoir roof and liner, we consider that Sydney Water has not implemented (acted in accordance) with its documented Asset Management System in this area. Therefore, we consider that this is a non-compliance with the requirements of this clause.

In assessing the materiality of the non-compliance, we are required to consider whether the non-compliance adversely impacts on the ability of Sydney Water to achieve defined objectives and assure controlled processes, products or outcomes. The relevant objective is the Asset Management Objective to "manage our assets to meet set customer service outcomes and comply with relevant regulatory requirements and outcomes". While we consider that the absence of NSW Health from important project meetings will have certainly limited the effectiveness of Sydney Water in achieving this objective, we cannot conclude that this would have certainly led to a non-compliance

with regulatory outcomes and we therefore conclude that this is a non-material non-compliance.

Implementation and monitoring

The implementation of the asset management system is monitored through audits (internal and external audits), process reviews, governance forums, and monthly performance reports and reviews at the business and Executive level.

As evidence of the range of audits and process reviews undertaken, Sydney Water provided to us a schedule of audits and process reviews undertaken in 2020-21 (List of audits and actions 2020-21-21.xlsx). Sydney Water advised that audit and review findings are recorded in BMIS, with corrective actions and improvement opportunities entered into the same database and progressed through a workflow.

As noted earlier, Sydney Water has a range of governance forums in place, such as the Product and Asset Management Leadership Group, and has provided to us the terms of reference for the key forums.

Sydney Water has also developed an Asset Management Improvement Plan, which includes actions sourced from external audits, internal reviews, internal investigations and Board initiatives. The Asset Management Improvement Plan was last updated on 20 September 2021.

Sydney Water also provided to us an example monthly asset performance report for June 2021 (Asset Performance_Month Report ALG (June Data).xlsx).

Potts Hill reservoir

Background and chronology

We queried Sydney Water regarding its asset management approach for the Potts Hill reservoir roof and liner in light of the water quality incidents relating to E. Coli detection in April and May 2021. Sydney Water advised that it had identified as early as 2018 that the roof and liner material of the reservoir was substantially degraded and in need of replacement, while also presenting risk to water quality and water security.

Sydney Water provided to us the Initial Approval Business Case (IABC) for renewal of the Potts Hill reservoir roof and lining. This IABC is dated 28 February 2019 and has the purpose of securing funding for the investigation and subsequent business cases needed to implement the renewal. The IABC notes that:

- The membrane material was installed in 1999 and is coming towards the end of its life, displaying the classical symptoms of tears and pin holing. Deterioration will continue due to the ultraviolet radiation from the sun degrading the membrane so that there is minimal tear resistance which will ultimately result in complete failure of the covers.
- While the IABC discusses risks such as water quality and continuity of supply, the version supplied to us does not have information included in the section dedicated to risk. This is consistent with the feedback provided below from Sydney Water that the IABC was a preliminary document and was not finalised.

The IABC notes that the "project has been identified for delivery no later than 2024 based upon the materials testing report and the related interim repairs". The IABC also has the following anticipated program:

- Needs Business Case approval - May 2019.
- Options Business Case - September 2019.
- Delivery Business Case - September 2020
- Delivery commence July 2022 and complete June 2024.

In response to the draft report, Sydney Water noted that:

"...[the] IABC was only a preliminary draft provided to the PCG to begin the conversation for the project. It provided a background to the current status for discussion purposes. The IABC was never finalised, and did not include a full scope as noted by the PCG who requested more consideration of other aligned components should be undertaken, no formal risk review included, costings and no procurement. It is Sydney Waters view that the dates in the document were at best 'indicative' and were still to be updated and confirmed in a final signed approved version once the full scope was finalised."

While we accept that the IABC was only a preliminary document and was not finalised, we consider that it provides an important reference point in time being the time at which the risks due to the end-of-life failure of the roof and liner were considered sufficiently material to require them to be addressed.

The Needs Approval Business Case (NABC) was approved in December 2020. That is, 18 months later than the May 2019 timeframe anticipated in February 2019 when this risk was considered sufficiently material to commence the IABC. We queried Sydney Water as to the causes for the delay and were informed that the reasons for the delay included:

- The initially submitted IABC did not have sufficient information to satisfy the Program Control Group (PCG) that they could assess the business case and therefore it was required to be resubmitted
- Re-prioritisation of resources to the drought and investigations into bulk water supply alternatives, which was reaching its peak during 2019
- Sydney Water undertaking a transformation and movement of staff between departments as well as transitioning to new Planning Partners
- The complexity of the standard business case templates and approval process during the period.

The NABC of December 2020 states that Sydney Water wished to undertake the work in winter 2020 but had identified that this could not be achieved due to the scale and complexity of the work, including for providing alternative water supply during the shutdown that would be required to undertake the work. Sydney Water clarified that this potential timing was due to the first reservoir being planned to be offline as part of the Drought Infrastructure Program which was occurring at that time and therefore presented a potential opportunity for the works. This potential timing opportunity was found to be unachievable and then was no longer an option after the drought broke.

The NABC also states that condition assessment and material testing in 2019 determined that the "RPP is no longer fit for purpose". The NABC goes on to state that this means that the existing liner has reached the end of its service life and has zero years of remaining service life. Further, the NABC states that:

"This means that the existing pinholes and tears currently present in the covers cannot be repaired. Over the next twelve months it is expected that the existing tears will get bigger and new tears will open-up. Ultimately, the covers will completely tear up providing no protection from contamination akin to operations pre-1999 when the covers were installed."

The 2019 condition assessment was undertaken in November 2019 and includes material testing. Other observations from the November 2019 condition assessment report include:

- the cover was in poor condition and degraded to a stage where the cover was showing signs of failure
- the stormwater system was not functioning adequately (which would increase the risk of contamination through ingress)
- samples of the liner were taken and sent for laboratory testing. This found that:
  - microscopic cracks were present in the polypropylene later, exposing the reinforcing layer
  - while the material had tensile and tear strength that is above minimum standards, the liner was no longer fit for purpose because the antioxidants and UV stabilisers in the material were effectively depleted, the mechanical properties were reducing, would the reinforcement were now exposed to the harsh environment which will cause them to degrade further

Sydney Water advised that a meeting was held on 14 January 2020 to discuss the findings of the November 2019 condition assessment report. Sydney Water states:

"This meeting determined a new risk assessment was required and that the NABC in production be adjusted based on the new findings. The Project Risk Assessment attached to the NABC was the output, and had the Asset Failure, leading to contamination and compromising water supply at a High 2."

The NABC risk assessment referred to above details the following control for managing the risk to water quality:

- develop a plan to mitigate contamination risk in the interim, until covers are replaced
- replace cover.

We requested Sydney Water to provide the plan referred to above "to mitigate contamination risk in the interim, until covers are replaced". Sydney Water responded:

"Prior to the mitigation plan being undertaken as originally intended - the risk of an issue with the cover materialised in March/April [2021].

The Needs BC was approved in Dec 2020, and the kick-off meeting for the next phase planning work occurred 27 Jan 2021, following the Christmas holiday period.

The rips were noticed in the covers in April [2021] and then became an incident managed by Operations, with the need to managing the real-life incident overtaking the development of a mitigation plan for it.

Modelling work had begun to develop the mitigation plan, which than morphed into informing a contingency plan for isolating / bypassing the reservoirs, not just for the liner/cover renewal work, but also for managing the risk to supply if / when further rips develop and we need to take the reservoirs offline."

In summary, Sydney Water did not prepare a mitigation plan for the identified risk of contamination because:

- the work to mitigate risks to continuity of supply were given higher priority
- detection of E. coli in April 2021 meant that Sydney Water initiated an operational response that overtook the risk mitigation planning (the prevent and prepare components of their incident and emergency management procedures). Sydney Water was then undertaking incident response.

As discussed, the NABC includes a detailed risk assessment and this is Attachment 3 to the NABC. This risk assessment includes a risk of "asset failure leading to contamination and compromising supply". This risk is assessed as having an uncontrolled risk of High 2 and a controlled risk of Medium 4. The controls are focused on the level of risk after renewal. There is no consideration of the risk that Sydney Water is carrying operationally until the cover and liner are replaced. This is somewhat understandable as the Business Case is focused on the renewal works and there are other processes in place for managing operational risks.

The NABC has the following expected milestones:

- Needs Business Case approval - November 2020
- Options Business Case Approval - May 2021
- Delivery Business Case - June 2022
- Completion June 2025

The Options Assessment Business Case (OABC) is dated 26 August 2021 and was approved in September 2021. The OABC states that the renewal had been planned for the winters of 2023 and 2024 but that "...planned investment to mitigate the long-term contamination risk is being expedited after the covers suffered large tears in April 2021". We note that the OABC approval is three to four months later than that anticipated in the prior NABC. Therefore, while Sydney Water is now intending to bring forward the renewal works, the planning and options assessment has been delayed between NABC and OABC. This is on top of the delays from the timing when measured against the program anticipated in February 2019 when the risk was considered sufficiently material for the IABC to be prepared. From February 2019, the delays are as follows:

- NABC approval - anticipated May 2019 and actual December 2020, i.e. 18 months later
- OABC - anticipated September 2019 and actual September 2021, i.e. 2 years later.

The OABC also includes a risk assessment that considers deferring the work to address the identified need. This risk assessment identifies water quality risks in the case of deferral as having a level of risk of Very High 1.

We wished to consider how Sydney Water had managed the operational risks to water quality arising from the roof and liner being at the end of their useful life. To this end, Sydney Water provided to us its 2019 Networks Water Quality Risk Assessment for Woronora, Illawarra and Potts Hill. This is a system wide operational risk assessments and not specifically related to the project but does include Potts Hill reservoir. This risk assessment includes Risk ID #3 for the hazardous event of "Reservoir ingress leading to deterioration in water quality and not meeting ADWG values". This assessment of this risk before and after control measures is shown in Table 2-23.

Table 2-23.Controlled and uncontrolled risk of degraded water quality from reservoir ingress 2019

	Before controls	After controls
Consequence	Catastrophic	Catastrophic
Likelihood	Likely	Very unlikely
Level of risk	Very High 1	High 2

The identified risk controls for the 2019 Networks Water Quality Risk Assessment for the risk of ingress to Pott Hill Reservoir have been tabulated by barrier type in Table 2-24.

Table 2-24. Identified risk controls by barrier type

Preventive	Detective	Reactive	Not applicable
Inspection and maintenance of reservoirs Perimeter fence and restricted access	SW On-line WQ monitoring (chlorine/turbidity/pH) CCTV on key reservoirs Regular water quality monitoring and testing at SW West Ryde Lab Compliance and operational monitoring Routine inspections (6 monthly inspections and during tablet dosing activities)	Drinking Water Quality Event Management Plan Contingency plans for reservoir isolation (where possible) once issue identified Reservoir isolation once issue identified	New reservoir design specifications Reservoir renewal program

We consider that these controls are of very limited effectiveness for the membrane cover failure and does not explain how the residual likelihood can be reduced from “Likely” to “Very unlikely”. We also noted that there was no improvement action identified in the risk register, but the risk comments noted that the Potts Hill reservoir WS455 &456 roof lining has reached the end of life and requires renewal.

We were also provided with the Southern Network (Potts Hill, Illawarra and Woronora) Operational Risk Assessment 2021 report (dated July 2021). This report includes a new action for 2021 to address the end of life of the Potts Hill reservoir roof. This report refers to a project risk assessment held on 14 May 2021. This report identifies a hazardous event of "Reservoir ingress leading to deterioration in water quality and not

meeting ADWG values" with an assessed risk of High 3 based on an "extreme" consequence and "very unlikely" likelihood. While this risk assessment considers an uncommon water quality event with an “extreme” consequence, two lower consequence events – the detection of E. coli – occurred on 7 April 2021 and 3 May 2021. Given these two events, we consider that it is surprising that the likelihood of “extreme” consequence water quality event was considered as only "very unlikely". We consider that this probability rating likely understates the risk that Sydney Water was facing.

We consider that the operational risk assessments reflect in the assessed risk and mitigation measures business as usual and do not appear to recognise the increasing level of risk associated with the Potts Hills reservoir.

Sydney Water responded to the draft report regarding these two issues to note that:

- Regarding the level of assessed risk – the May 2021 operational risk assessment concluded the same level of risk as the project risk assessment which was also undertaken in May 2021. The “key mitigating factors included the size of the storage at Potts Hill (500 ML) and the very high total chlorine residual (1.7 mg/L)”. Sydney Water notes that NSW Health was present at the May 2021 operational risk assessment and agreed with the risk rating.
- Regarding the mitigating measures:
    - Sydney Water's approach to drinking water management follows the ADWG multi-barrier approach.
    - Disinfection is the key control to managing re-contamination of the water supply within the water supply network. The residual in Potts Hill reservoir is consistently high (between 1.6 - 1.7 mg/L total chlorine) and there is an automated chlorination plant on the reservoir outlet. Disinfection is a robust control and is extremely effective.
    - Sydney Water undertakes routine monitoring and maintenance of the roof lining linked with checks on the dam which occurs three times a week.
    - Follow up temporary repairs in March 2020 which were successful in maintaining the integrity of the cover
    - Updating risk assessments - both operational and project related – as required

We acknowledge that Sydney Water has in place controls for managing water quality risk at Potts Hill reservoir that are based on considerable experience of managing the facility and downstream water quality. However, our concerns regarding the management of the risk arising from ingress of contaminants is to do with both the level of mitigating measures in place (based on Sydney Water’s experience), and how the mitigation approach changed over time as Sydney Water’s understanding of the level of risk that it was managing changed.

We make the following observations regarding the mitigating measures described by Sydney Water:

- The routine monitoring activities reflect business as usual. Outside of the audit period (September 2021) and well after the current level of risk became apparent (November 2019), Sydney Water has identified additional monitoring activities

which include increased surveillance of the perimeter and for signs of animals. These are examples of increased mitigation measures that could have been undertaken sooner as the level of risk increased.

- Sydney Water advised the inspections of the Potts Hill reservoir Roof had been undertaken 3 times a week since November 2019. We cannot reconcile the effectiveness of this control against the delay in detecting the membrane tear following the wet weather event.
- While the success of temporary repairs is important as a reactive control to prevent future risk, it does not prevent risk until a hole is identified.

The further information provided by Sydney Water in response to the draft report, has not provided evidence that Sydney Water sought to identify and implement risk mitigation measures within the audit period that went beyond business as usual or reflected the changing nature of the water quality risk. There is no evidence of a considered and consolidated Mitigation Plan as required by Sydney Water's own processes. Sydney Water states that while it accepts that documentation of mitigation and monitoring plans requires improvement, this does not warrant a Material Non Compliance.

To enable it to take the Potts Hill reservoir offline, Sydney Water requires the Sydney Desalination Plant to operate at a minimum flow of 50 ML/d to maintain water quality and security of supply. The desalination plant was already operating under an Emergency Response Notice (ERN) due to unrelated water quality issues at Warragamba Dam. The ERN for Potts Hill reservoir is dated June 2021 and is for an initial 6 month period but it is noted that operation of the desalination plant for up to 18 months may be required to accommodate the works. The estimated cost of operating the desalination plant for 6 months is $10-14 million.

Conclusions

Our conclusions regarding how the Potts Hill reservoir renewal and water quality event illustrate Sydney Water's implementation of its asset management system are divided into two themes:

- asset management planning
- managing the operational risk.

Asset management planning

Sydney Water is managing a roof and liner for the Potts Hill reservoir which has reached the end of its service life. Condition assessment over time has identified degradation of the material and patch repairs have been previously undertaken. In 2018 it was decided that the liner was degraded to the extent that renewal was required. The preliminary IABC in 2019, although not finalised, captured this need and sought funding for further planning for replacement from 2022 - 2024, noting that these are substantial works given the size of the reservoir and its importance to supply (the reservoir supplies over 2 million customers).

While the apparent risk associated with failure of the roof and liner has increased over time as the assessed condition has worsened (the likelihood of failure has increased),

this project has been subject to ongoing delays against the program initially anticipated in February 2019 and recorded in the preliminary IABC. Approval of the NABC was delayed 18 months beyond that anticipated in the preliminary IABC and the OABC was delayed 2 years beyond that anticipated in the IABC.

Sydney Water has identified that reasons for the delay include:

- re-prioritisation of resources as it was dealing with significant drought and consideration of bulk water supply alternatives
- business transformation including internal staff movement and transitioning to new Planning Partners
- the complexity of its business case and approval requirements.

Events subsequent to February 2019 have shown that:

- The remaining service life assessed in 2018 as 3 years was too high and was subsequently revised down to zero years by the November 2019 condition assessment
- Sydney Water initially underestimated the requirements for renewing the roof and liner, particularly to shutdown the reservoir and maintain continuity of supply. When the work was attempted to be brought forward in 2019, it was then pushed back again.

We understand how, even under a well implemented asset management system, that Sydney Water could find itself in a position where it is managing a relatively high (and increasing risk) to water quality from ingress of a failed liner but facing a difficult renewal task due to the complexity of the renewal work alongside the complexity of the extended shutdown. In early 2019 the business thought it had three years to solve the problem and was planning accordingly. It turned out that it did not have this time available to it.

What was fully within Sydney Water's control was its ability to plan an appropriate response to the end of the liner’s life; that is, to renew the asset expediently. We consider based on the evidence provided that complex business process, deprioritisation and insufficient resources in turn are evidence that Sydney Water's asset management system was not implemented sufficiently to address this risk to service delivery. While we consider that Sydney Water will have very likely been non-complaint with its Operating Licence requirement to implement its asset management system at this time, these events are outside of the audit period and we do not consider them further. Within the audit period, there is sufficient evidence that Sydney Water has acted with urgency and consideration to mitigate this risk.

Managing the operational risk

Sydney Water's asset management policy has a guiding principle that assets be managed for the lowest life cycle cost to achieve the desired level of service at an acceptable risk. Under Sydney Water's risk management framework, risk appetites for different types of risk are defined and represent the level of risk that the business is willing to accept. For public health, Sydney Water has an "averse" risk appetite which

means that it is "opposed to risk taking". The risk appetite statement for public health is that "Sydney Water must always protect public health".

The risk management framework also provides guidance on how risks should be managed through its "priority for attention" matrix which is reproduced in Figure 2-1.

Figure 2-1. Priority for attention matrix excerpt

Current level of risk	Topic	Detail
Very high	Action	Do not start the activity that could trigger the risk, or stop the activity if it has started already, until actions have been taken to reduce the level of risk
	Timing	Take action at once
	Reporting	Report at once to the immediate line manager
	Escalation	Notify the Board via the Managing Director at once Notify the Head of Corporate Public Affairs and Risk at once
	Authority	Activities that could trigger the risk must not start or continue without explicit approval from the Managing Director
High	Action	Take actions to reduce the level of risk to as low as is cost-effective
	Timing	Take action within 3 months
	Reporting	Report at once to the immediate line manager
	Escalation	Notify General Manager as soon as possible Notify the Head of Corporate Public Affairs and Risk as soon as possible
	Authority	Activities that could trigger the risk must not start or continue without explicit approval from the appropriate General Manager

When considering how Sydney Water managed the operational risk associated with ingress and contamination arising from the degradation of the roof and liner material at the Potts Hill reservoir, we make the following observations:

- Sydney Water has initially assessed the risk of contamination in 2019 as Very High without controls and High with existing and planned controls
- In November 2019, Sydney Water received unequivocal evidence that the liner material was:
  - at the end of its useful life, i.e. failed
  - degraded to a state that microscopic tears were present
- This November 2019 condition information is sufficient to state that the risk of water quality failure will have increased due to the likelihood of this event having certainly increased above prior understanding. Despite the available information suggesting that the level of risk carried by Sydney Water has increased, this appears not to have been acknowledged or documented by Sydney Water. For example, the risk assessment included with the NABC assesses the risk after controls as being Medium 4 but the controls are focused on the level of risk after renewal. There is no consideration of the risk that Sydney Water is carrying operationally until the cover and liner are replaced.

- Sydney Water identified in its NABC of December 2020 a risk mitigation measure to "Develop a plan to mitigate contamination risk in the interim, until covers are replaced"
- Sydney Water did not develop this envisaged "plan to mitigate contamination risk in the interim, until covers are replaced"

Sydney Water stated in response to the draft report that its Risk Management Framework allows for the acceptance of high risks with an appropriate monitoring plan in place. Sydney Water states further that “it is unreasonable to expect that every high risk can be reduced to medium or low in a cost effective manner quickly”.

We agree, and do not expect, that high risks need to be reduced to a “medium or low” level quickly. The “priority for attention” matrix requires that the risks be reduced to a level that is as low as is cost-effective. We understand for many risks that the cost-effective level may be “high”, especially in the short and medium term. What we have not been provided is evidence that Sydney Water evaluated mitigation measures for their cost effectiveness and effectiveness at reducing the level of risk.

Based on:

1. Sydney Water's stated approach to managing risk, as detailed in the Asset Management Policy, the risk management framework and the risk appetite statements
2. Sydney Water's actions, which were not in accordance with its risk management approach:
    - It continued to accept an operational risk (in the interim until the liner would be replaced) that was high (and likely to be very high based on the November 2019 condition assessment) without considering further mitigation steps as it was obliged to do under the "priority for attention" matrix. There is no evidence that Sydney Water has sought to reduce this risk to a level that was as low as cost-effective.
    - The annual operational risk assessments did not include sufficient or appropriate measures for mitigating the water quality risk. The mitigation measures reflect business as usual and do not appear to recognise the increasing level of risk.
    - It did not prepare a risk mitigation plan that it had identified was required in the NABC

we consider that Sydney Water is non-compliant with the requirement of this clause to implement its asset management system.

In considering the grade of non-compliance, the Audit Guideline distinguishes between deficiencies that **do not** adversely impact on the ability to achieved defined objectives or assure controlled processes, products or outcomes as being non-material and deficiencies that **do** impact on the ability to achieved defined objectives or assure controlled processes, products or outcomes as being material. With respect to the Asset Management System, the defined objectives are the Asset Management Objectives which include:

We will ensure key risks are understood and the appropriate controls to mitigate and adopt risks are in place.

We consider that this objective has not been met as:

1. Sydney Water appears not to have fully understood the water quality risk as demonstrated by not adjusting its assessed risk when the condition of the material was known to be worse than previously thought and worsening
2. Appropriate controls to mitigate the water quality risk, as Sydney Water has identified itself, and as required by its risk management framework, where not in place.

Therefore, given the above, this non-compliance is material.

In response to the revised draft audit report, Sydney Water set out that it considers that it fully assessed and understood the key risks associated with Potts Hill reservoir and put appropriate mitigation measures in place for these risks. Sydney Water acknowledges that there was no formal risk mitigation plan but it considers that its mitigation measures ensured there was no impact on the continued delivery of high quality drinking water and customer service.

Sydney Water believes that the material non-compliance grading has not accounted for the following:

- prevention and planning measures in place including inspections, maintenance, monitoring and repairs when holes were identified
- the holistic approach being taken to manage the various material issues occurring at the time including the end of the drought and the storm events in the first quarter of 2021
- that the mitigation measures in place were already above normal requirements compared with other reservoirs managed by Sydney Water and were deemed appropriate by the business to manage the risk at the time.

Sydney Water also acknowledged that its documentation of how it identifies and implements risk mitigation measures can be improved.

We recognise that Sydney Water has a long corporate knowledge of managing the Potts Hill reservoir that is reflected in both formal processes and procedures as well as the tacit knowledge and experience of its staff. We also recognise that while the Potts Hill reservoir has faced considerable risk to water quality, no significant water quality events have occurred during the audit period. In arriving at our conclusion regarding this non-compliance we have had to consider the evidence of the mitigating actions being undertaken along with the materiality (level of consequence) associated with the risk.

A challenge for us has been that operational changes in response to the increasing level of risk are not well documented. For this audit, we require this evidence on which to base our conclusions. This lack of evidence has been a factor in arriving at the non-compliance grading but it is not the only reason for the non-compliance grading. Given the importance of the Potts Hill reservoir in supplying Sydney (it supplies more than 2 million customers), we expected that Sydney Water would be taking extraordinary (and readily identifiable) risk mitigation measures as the apparent level of the risk

increased (beginning from November 2019). We could not find evidence that this had occurred. Sydney Water notes that it was facing multiple risks with relatively high consequences at the time, particularly water continuity risks. While we accept that Sydney Water had substantial other issues to manage during the audit period, these do not diminish the absolute level of water quality risk at the Potts Hill reservoir.

On the basis of the information available to us, including Sydney Water's representations following the revised draft report, we maintain our conclusion that we consider that Sydney Water was not compliant with this clause and that the non-compliance was material.

North Richmond WFP

Another area where we considered implementation of the Asset Management System was through the annual risk review for the North Richmond WFP. This risk assessment considers the risks to service delivery holistically and identifies a large number of risks relating to management of the assets including:

- Ageing raw water intake structure
- Little room on site for asset expansion
- No visibility of the planning activity of the reservoir maintenance and renewal
- No redundancy of critical control points instruments
- Switchboard at WP193 that supplies power to the treatment plant is in poor condition.

While this document demonstrates that Sydney Water is actively identifying asset related risks, it also demonstrates that Sydney Water has considerable work to do to manage these risks.

Recommendation

Recommendation 5.5.2-1: We recommend that by 30 June 2022 Sydney Water reviews its project development and assurance approach (i.e. business case and gateway process and documents) to determine whether the mitigation measures identified in project risks assessments are recorded and their implementation tracked.

Recommendation 5.5.2-2: We recommend that by 30 June 2022 Sydney Water reviews any public health related project risks to determine whether the management of these risks is in accordance with its risk management framework.

Opportunities for improvement

OFI 5.5.1-1: We suggest that Sydney Water review its approach to identifying stakeholder needs for the Asset Management System and determine whether the approach needs increased focus on business as usual requirements rather than stakeholder expectations for one-off projects.

OFI 5.5.1-2: We suggest that Sydney Water assesses whether the Strategic Asset Management Plan (and its associated artefacts), sufficiently details how the Asset

Management Objectives consider the requirements of stakeholders and of other financial, technical, legal, regulatory and organisational requirements.

OFI 5.5.1-3: We suggest that Sydney Water assesses whether the Strategic Asset Management Plan (and its associated artefacts) sufficiently details the requirements and expectations of relevant stakeholders.

Clause 7.2 – Memorandum of understanding with FRNSW

Clause 7.2.2

Table 2-25. Clause 5.5.2 compliance grade

Subclause	Requirement	Compliance grade
7.2.2	Sydney Water must use its best endeavours to comply with the memorandum of understanding with FRNSW.	Compliant

Risk	Target for full compliance
If Sydney Water does not comply with the requirements of the MoU it may make FRNSW less effective in providing protection from fire or lead to higher costs for FRNCW to provide its service	Sufficient evidence that Sydney Water is undertaking the actions to which it has committed in the memorandum of understanding.

Summary of reasons for grade

Sydney Water has provided sufficient evidence to demonstrate that it is undertaking actions that are consistent with the strategies that support the objective in the memorandum of understanding with FRNSW. These actions include sharing information, repairing hydrants, and modelling. While activities have slowed in the audit year due to competing priorities and covid restrictions, we are satisfied that Sydney Water has demonstrated that it is using its best endeavours, particularly through the established, business as usual actions.

This clause is graded Compliant.

Discussion and notes

Sydney Water's previous Operating Licence required it to enter into a memorandum of understanding (MoU) with Fire and Rescue New South Wales (FRNSW) by 31 December 2015. The current licence requires (Clause 7.2.1) that Sydney Water use its best endeavours to maintain a MoU with FRNSW. The purpose of this clause (Clause 7.2.2) is that Sydney Water does what is required of it within the MoU.

The purpose of the MoU is then detailed in Clause 7.2.3 and is to include:

- roles and responsibilities of each party
- identification of the needs and constraints of each party
- identification of strategies for efficient and effective provision of firefighting water.

Sydney Water detailed the history of the MoU and how it had developed through consultation and collaboration between the two parties to identify goals and relevant workstreams. There is no specific requirement in the Sydney Water Corporation Act, Operating Licence or Customer Contract for Sydney Water to make water available for

firefighting purposes. However, Sydney Water understand that it has a general obligation to provide a water supply system that is not prone to failure and would meet community needs, including firefighting activities. In addition, Sydney Water has a duty of care based on common law, to those who seek to rely on a reticulated water system and the supply of water for firefighting activities from that system.

While Sydney Water provides most of the fire-fighting water supply in Sydney, there are exceptions. e.g. Central Park has its own system and some industries have trickle feeds to storage tanks.
We queried Sydney Water whether it had defined what constituted "efficient and effective" provision of firefighting water. Sydney Water responded that while this had not been defined explicitly, the 1997 Policy Manual for Supply of Water for Firefighting Purposes provided a sound reference and was still current in many areas.

We queried Sydney Water as to what constituted the strategies referred to under the MoU. Sydney Water advised that the following MoU themes can be seen as the strategies the two parties are pursuing to deliver on the goal of efficient and effective provision of firefighting water:

- Maintenance of the MOU
- Information sharing
- Policy
- Network capacity reporting
- Network design criteria
- Backflow prevention on fire services
- Fire prevention measures

These themes are carried through the meetings and collaboration between the parties. This is demonstrated by the working group meeting minutes from a meeting held on 1 December 2020. Further, there is a in place a Responsibilities, Accountabilities, Consult and Inform (RACI) matrix (dated August 2021) which is aligned with these themes and defines the roles and responsibilities of the parties and tracks progress against actions. While the document provided is outside of the audit period, we understand that this is a live document that was current through the audit period and consistent with previous versions.

We discussed aspects of each of these themes with Sydney Water including the activities being undertaken, the constraints and what is planned. We expand on some of these aspects following.

FRWNSW has a planned program to inspect hydrants annually but Sydney Water could not confirm whether this was being achieved. FRNSW also paints hydrant plates and covers. Where any deficiencies are found (e.g. access, hydrant too deep, inoperative etc) Sydney Water was advised by FRNSW using a custom app.

Sydney Water does not undertake maintenance of hydrants or valve as this is not necessary. Instead, Sydney Water relies on FRNSW to advise them on any deficiencies. Sydney Water has a field crew that undertakes localised hydrant repairs or replacement.

Regarding modelling, Sydney Water commenced preparing high quality hydraulic modelling for flows at each hydrant but this was found to be complex and time

consuming. Sydney Water is proposing that FRNSW accept model outputs at street level rather than individual hydrants. This is under discussion between the parties. The flow/ pressure outputs from modelling are at the pipe rather than at the hydrants. Sydney Water acknowledged that there would be high head loss through unlined hydrant risers and hydrants and tuberculated hydrant units is a known issue.

FRNSW has expressed concern over the resources dedicated by Sydney Water to network performance modelling. Sydney Water responded to us that it has been challenged in delivering modelling due to resource constraints and as it has had to better refine the scope of works required and plan to deliver the work. FRNSW has also expressed concern over Sydney Water's commitment to the MoU as evidenced by there only being one meeting held between the parties during the audit year.

In assessing this clause, we have to consider what the MoU requires of Sydney Water. Clause 7.2.3 defines broad principles for collaboration and promoting the objective of achieving efficient and effective firefighting water. In doing so, Sydney Water has to use its best endeavours and in this regard, Sydney Water has identified that it has been constrained by competing priorities during the audit period, in particular its response to COVID-19. To help demonstrate its commitment to the strategies and actions in the MoU, Sydney Water provided to us an estimate of its expenditure made in support of the activities since 2015. The largest components of expenditure are for repairs to hydrants and modelling.

Based on the information provided, particularly the ongoing activities which have become business as usual such as sharing information, rectifying defects and investigating poor water pressure, we conclude that Sydney Water has complied with this clause.

However, we consider that there are opportunities for the parties to improve the operationalisation of the MoU and we therefore recommend that Sydney Water considers implementing the following:

1. Defining, along with FRNSW, what constitutes "efficient and effective" provision of firefighting water
2. Defining, in collaboration with FRNSW, an annual work program which makes clear the strategies being pursued to achieve the overall objective and the actions that support the strategies
3. Commit to regular meetings (e.g. quarterly) to review progress against the proposed work program and to identify if any corrective actions or reprioritisation of tasks is required.

Recommendation

No recommendations are made

Opportunities for improvement

OFI 7.2.2-2: We recommend that Sydney Water considers implementing the following:

1. Defining, along with FRNSW, what constitutes "efficient and effective" provision of firefighting water

2. Defining, in collaboration with FRNSW, an annual work program which makes clear the strategies being pursued to achieve the overall objective and the actions that support the strategies
3. Commit to regular meetings (e.g. quarterly) to review progress against the proposed work program and to identify if any corrective actions or reprioritisation of tasks is required.

Clause 10.2 – Reporting

Clause 10.2.2

Table 2-26. Clause 10.2.2 compliance grade

Subclause	Requirement	Compliance grade
10.2.2	Sydney Water must comply with all of its reporting and auditing obligations set out in the Reporting Manual, including in relation to: a) water conservation and planning; b) performance standards for water quality; c) performance standards for service interruptions; d) Customers and Consumers; e) information and services for competitors; f) critical infrastructure security; and g) performance monitoring and reporting.	Non-compliant (non-material)

Risk	Target for full compliance
Without accurate and timely information, there is a risk that the performance of Sydney Water against its Operating Licence requirements will not be known	Evidence that Sydney Water has provided all of its information for reporting and auditing as set out in the Reporting Manual and on time

Summary of reasons for grade

Two non-compliances were found. The first was when reporting performance standards for service interruptions, Sydney Water did not provide information relating to major drivers for observed performance and variances to historical performance for all three indicators as required under the Reporting Manual. The second was data gaps in the reporting of the Quarterly – Water Quality Monitoring Report – Drinking Water (public reports).

The clause is Non-compliant (non-material).

Discussion and notes

This clause requires that Sydney Water comply with all its reporting and auditing obligations set out in the Reporting Manual, including in relation to:

a) Water conservation and planning
b) Performance standards for water quality
c) Performance standards for service interruptions
d) Customers and consumers
e) Information and services for competitors
f) Critical infrastructure security
g) Performance monitoring and reporting.

Only sub-clauses a), b), c), e) and g) are within the scope of our audit.

Under Sydney Water's Reporting Manual, and where relevant to the scope of our audit, Sydney Water has the following reporting obligations:

- Water conservation and planning:
  - Annual – Water Conservation Report
- Performance standards for water quality
  - Quarterly – Water Quality Monitoring Report – Drinking Water
  - Quarterly – Exception reporting to NSW Health (drinking and recycled water)
  - Monthly – Reporting on fluoride monitoring to NSW Health
  - Annual – Compliance and performance reporting (drinking and recycled water)
  - Incident and emergency reporting – Drinking Water and Recycled Water (as required)
  - Notification of significant changes to Water Quality Management Systems (as required)
- Performance standards for service interruptions:
  - Annual – Compliance and performance reporting
  - As required – Strategic Asset Management Plan
- Performance monitoring and reporting:
  - Annual – Statement of compliance
  - Annual – Audit recommendations
  - Annual – Compliance and performance reporting – performance indicators
  - Annual – Compliance and performance reporting – environmental performance indicators.

We discuss Sydney Water's compliance with each of these obligations below.

Water conservation and planning

As noted against Clause 3.1, Sydney Water has prepared a Water Conservation Report for 2020– 2021. We discuss the compliance of the contents of the Water Conservation Report against Clause 3.1.

Under its Reporting Manual, Sydney Water must submit the Water Conservation Report to IPART and DPIE by 1 September following the end of the relevant financial year, or another date approved by IPART. We were provided with the Water Conservation Report provided to IPART as part of the 1 September 2020 Report.

As noted against Clause 3.1, Sydney Water advised that, in 2020-21, the Minister for Water, Housing and Property did not issue a direction to update the economic level of water conservation methodology.

Performance standard for water quality

Quarterly – Water Quality Monitoring Report – Drinking Water

The Sydney Water Reporting Manual requires that Sydney Water prepares a report each quarter on their performance against all health and aesthetic water characteristics and raw water operational characteristics identified in the Drinking Water Quality Management System and publish this report on its website within four weeks.

Sydney Water prepares quarterly reports for each of their supply systems. We have previously confirmed with IPART that this approach is appropriate (the obligation does not require the preparation of a single report covering all the systems).

The Annual Drinking Water Quality Monitoring Plan 2020-21 (Annual Monitoring Plan; BMIS0045.01) documents the testing regime relevant to this clause. We downloaded and tested the North Richmond Delivery System Quarterly Drinking Water Quality Report April to June 2021 report (Quarterly Report). The document properties show the document was produced on the 28 July 2021, which meets the four-week requirement.

We cross checked the compliance sampling and reporting requirements with the quarterly report (Table 2-27) and found areas of non-compliance. The long-term performance of many parameters is reported as:
"The 95th percentile value is less than the respective ADWG health guideline value."

The ADWG monitoring section states

"In assessing and reporting long-term chemical performance against health-based guideline values, the number of monitoring results available for the reporting period needs to be considered."

"Given that generally few data points will be available for evaluation, performance against the guideline value is determined based on the maximum result.

If a longer data set is being evaluated, or there are sufficient sample results from the 12 month review period to support a statistically valid evaluation of the results, then the 95th percentile statistic should also be listed and used to determine performance against the guideline value."

We question reporting against the 95th percentile for the smaller sample set (some have only 2 data points).

Table 2-27. Comparison of the Annual monitoring plan requirements with the Q4 North Richmond Water Quality Report

Annual monitoring plan		North Richmond Quarterly Drinking Water Report
Table #	Requirements	
6	Annual E. coli sample numbers by delivery system	The water quality report records 180 E. coli samples were taken. This sample number meets the requirements of the plan. One exception was reported and the long-term performance was assessed.
9	Health characteristics and sampling frequency for supply to customer monitoring at WFP and customers tap	The number of samples reported in Table 1 of the Quarterly Report match the frequency specified in Table 9 of the Annual Monitoring Plan. No exceptions were reported and the 95th percentile value was reported as being less than the ADWG health guideline.
10	Health characteristics and sampling frequency for North Richmond raw water	Table 9 in the quarterly report tabulates the raw water sampling requirements for North Richmond. Beryllium and Uranium are missing from this table. The results are not reported. The schedule in Table 10 in the quarterly report includes all the pesticides and herbicide in Table 10 of the monitoring plan but does not include their results.

Annual monitoring plan		North Richmond Quarterly Drinking Water Report
11 &12	Aesthetic characteristics for supply to customer [1]	The number of samples reported in Table 2 of the quarterly report match the frequency specified in Table 11 and 12 of the monitoring plan with the exception of temperature and total dissolved solids. These two parameters are reported in Table 3 of the quarterly report as "Typical values for your area." Sample numbers could not be confirmed from the report (but are not required) Results in Table 2 were reported as averages and it was noted that they met the long-term performance measures were below the guideline values.
15	Trihalomethane monitoring at WFP and customers tap	The water quality report records 36 samples were taken. This sample number meets the requirements of the plan. The results were report as a 95th percentile statistic.
16	n-nitrosodimethylamine (NDMA) monitoring at WFP and customers tap	The water quality report records 2 samples were taken in the delivery system (Table 1). This sample number meets the requirements of the plan. The results were report as a 95th percentile statistic. The water quality report records 1 sample was taken at the filtrations plant (Table 5). This sample number meets the requirements of the plan. The results reported at the WFP was below the reporting limit (<0.000010).

Note 1: Also includes total dissolved solids (aesthetic) and sulfate (health and aesthetic) at the WFP

Quarterly – Exception reporting to NSW Health (drinking and recycled water) and incident and emergency reporting – Drinking Water and Recycled Water (as required)

The Sydney Water Reporting Manual requires that Sydney Water prepares a report each quarter on their monitoring of drinking and recycled water and provide it to NSW Health within 6 weeks. The report must include the performance against all health and aesthetic guideline values in the relevant monitoring program in the DWQMS and RWQMS and critical control point breaches and action taken.

We reviewed the Fourth Quarter 2020-21 Drinking water quality monitoring report to NSW Health. The E. coli data reported aligned with the results recorded in the June 21 Compliance_Assessment_against_Health_Guidelines spreadsheet and the output we had been provided from SWIRL. The report also contains appendices that summarise individual filter performance to targets and CCP limits

Sydney Water advised that the fourth water quality report to NSW Health also doubles as an annual compliance report as it details compliance (12 months) against microbial, health-related chemical and aesthetic criteria defined under the ADWG.

We reviewed the 2020-21 Quarterly Recycled Water Quality Monitoring Reports for NSW Health compared with the 2020-21 Liverpool Irrigation Scheme Monthly Reports and found the following discrepancies:

- The First Quarter 2020-21 Recycled water quality monitoring report includes an exception for total suspended solids that is not in the July, August or September 2020 monthly irrigation reports.

- The October 2020 monthly irrigation report includes exceptions for manganese, copper, total nitrogen, total phosphorus, total suspended solids and CBOD that are not in the Second Quarter 2020-21 Recycled water quality monitoring report.
- The Second Quarter 2020-21 Recycled water quality monitoring report includes an exception for E. coli that is not in the October, November or December 2020 monthly irrigation reports.

Sydney Water updated the IMS Work Instruction for Recycled Water Reporting (MP0021) on 30/10/2020 to include manual checking of the BI reports used for quarterly reporting against the monthly exceedance reports. This modification was required to be completed by 30/6/21 under Recommendation 2020-16. The third and fourth quarter 2020-21 Recycled water quality monitoring reports and the January to July monthly irrigation reports had no discrepancies which indicates that the revised work instruction has improved the accuracy of these reports.

We were provided with the SWIRL records for drinking and recycled water quality incidents. We sampled these records and found NSW Health has been notified as required.

Monthly – Reporting on fluoride monitoring to NSW Health

Sydney Water is required to prepare a monthly a report containing fluoride monitoring information required by the New South Wales Code of Practice for Fluoridation of Public Water Supplies (the Code) or specified by NSW Health and submit this report to NSW Health within two weeks following the end of the relevant month.

Evidence was provided that the daily treated water fluoride concentration results for April 2021 for the nine plants had been provided to NSW Health on 9/5/2020, which meets clause 10.2.1.2 of the Code.

The report also contained the distribution system samples for the 13 distribution systems required under clause 10.2.2.1. Sufficient samples had been taken and reported to demonstrate compliance with the Code.

Annual – Compliance and performance reporting

The Sydney Water Reporting Manual requires that Sydney Water prepare a compliance and performance report on its management of the quality of Drinking Water and Recycled Water and submit this to IPART and NSW Health by 1 September.

The compliance and performance report must include:

- The Drinking Water and Recycled Water quality management activities and programs completed by Sydney Water in the financial year to meet its water quality objectives, including the results and outcomes from those activities and programs;
- The Drinking Water and Recycled Water quality management activities and programs proposed to be undertaken by Sydney Water to meet its water quality objectives, including the expected outcomes, scope and timetable for completion;
- An assessment of the performance of critical control points (as identified by the Water Quality Management Systems) over the long-term in accordance with the

Australian Drinking Water Guidelines and the Australian Guidelines for Water Recycling (each, a Guideline) (as the case may be);

- An assessment of the review and continual improvement conducted over the previous 12-month period (as identified by the Water Quality Management Systems) in accordance with Element 12 of the relevant Guideline;
- Any significant changes made to a Water Quality Management System; and
- Any non-compliance with a Water Quality Management System and the action/s taken to resolve those non-compliances.

Sydney Water addresses this obligation through the productions of the Annual Drinking Water Quality Management Compliance and Performance Report and the Annual Recycled Water Quality Management Compliance and Performance Report (referred to in the rest of this section as the Drinking Water Compliance Report and the Recycled Water Compliance Report)

The structure of both reports clearly identified the reporting requirements

However, we consider the reporting obligation has not been met. A summary of the compliance of the reports with the reporting obligations is given in Table 2-28.

Table 2-28. Summary of compliance with reporting obligations

Aspect	Observation
Completed drinking or recycled water quality management activities and programs	In both reports, this section tabulated the water quality management activities and programs progressed or completed by Sydney Water in the financial year to meet its water quality objectives, including the results and outcomes. The auditor found it difficult to distinguish between the items that had been completed and those that had been progressed.
Proposed activities and programs	In both reports the reporting requirements were met.
Performance assessment of CCPs over the long-term in accordance with the ADWG or AGWR (as relevant)	Table 5-1 of both reports tabulated the number of CCP exceedances (no exceedances were reported for either product). The drinking water report tabulated exceedances by plant for the each of the last five years. The recycled water report noted that historically CCP exceedances would have been recorded in SWIRL and not had been recorded. As noted previously, the fourth water quality report to NSW Health also doubles as an annual compliance report that details compliance (12 months) against microbial, health-related chemical and aesthetic criteria defined under the ADWG. The appendix of this report is the level of detail the auditor would have expected in the Annual Compliance report.
Assessment of the review and continual improvement conducted over the previous 12 months	In both reports, this section contained selected actions from the relevant improvement register. The action, status, and estimated completion date were reported. Completed actions were not explicitly reported. Sydney Water has developed a dashboard for reporting improvement plan progress. This tool would be well utilised for this section of the report.
Significant changes	Sydney Water advised of a significant change to both systems associated with the review of the public health descriptors in the risk matrix. It also advised on the implementation of scheme level Drinking Water Quality Management Plans.

Aspect	Observation
Non compliance with the management system	We opined last year regarding Sydney Water's narrow interpretation of "compliance" when reporting against this requirement. We would expect this section to extend beyond merely reporting non-conformances noted in the ISO19001 certification and the Operational Audits. As a minimum, we would expect internal audit findings for the water quality management system, debriefs and incident investigation that indicated the management system had not been followed to be included. The recommendation to engage with NSW Health is made to address this shortcoming.

Performance standards for service interruptions

As noted against Clauses 5.1 to 5.3, Sydney Water has prepared an Operating Licence Compliance and Performance Report for 2019 – 2023, relating to system performance standards in 2020-21. The content requirements of this report are detailed in the Reporting Manual as follows:

- Information on Sydney Water's compliance or non-compliance with the performance standards for service interruptions specified in Part 5 of the Licence in accordance with the template in Appendix B of this Reporting Manual; and
- An explanation of how Sydney Water has met or failed to meet the performance standards for service interruptions, which details:
  - Major factors (both positive and negative) that have influenced Sydney Water's performance, including factors that are both within and beyond Sydney Water's control; and
  - Reasons for any significant variation (both positive and negative) between Sydney Water's performance in the financial year and performance in the previous five years.

In 2019/20, Sydney Water was assigned a grade of non-compliance (non-material) against this clause because it was observed that Sydney Water failed to adequately discuss the major factors driving performance and the variance to historical trends for two of the three performance standards. This resulted in Recommendation 2020-22. We discuss Sydney Water's progress against this recommendation in a following section of this report. Because this same discussion is relevant to Sydney Water's compliance with this clause, we also include this discussion here.

For this audit, we reviewed the 2020-21 performance standards report to test whether it met the Reporting Manual requirements. We found that Sydney Water has increased the discussion included within this report of factors that have influenced the observed performance. However, we found the discussion to be generally at a high level. We acknowledge that both positive and negative factors have generally been discussed but the Reporting Manual also requires Sydney Water to discuss factors that are within and beyond its control and this discussion is lacking.

Regarding the second requirement of the report to detail reasons for any significant variance in performance between the current year and the previous five years, we note that:

- Water continuity – the report includes a chart comparing the current year with the previous five years. There is also further analysis and discussion regarding the impact of soil moisture content (although this only includes the current year and four preceding years, not five) and main size.
- Water pressure – the report does not include a comparison of the current year with the last five years because it is noted that the reporting definition changed with the introduction of the new Operating Licence in 2019. Nevertheless, as this is the second year of reporting under this definition, we consider that Sydney Water should have included a backward looking analysis between the current year and the prior year. This could then be extended in future years.
- Dry weather overflows – the report includes charts that compare the current year performance with the prior five years for both the number of dry weather overflows and the number of repeat overflows. The report includes one paragraph establishing the deep soil moisture has a strong correlation with blockages and overflows. There is then one paragraph discussing the five year trend against the current year. We note that:
  - There is no data provided on the level of deep soil moisture (i.e. as there is for soil moisture at 0.1 – 1.0 m depth earlier in the report for water continuity)
  - The discussion of the relationship between soil moisture and performance, i.e. "During 2018/19 extremely dry soil condition resulted in an increase in properties affected" does not match the reported data as the 2018-19 year is relatively consistent with 2015-16 and 2016-17 and a small increase on the prior year. The trend is generally stable, not reflective of an extreme. There is then no information in the report to validate that increased soil moisture has driven the improved performance seen in 2019-20 and 2020-21.

Based on the above observations that:

1. The discussion of factors that influence performance is at a high level only
2. There is no backward looking analysis of performance for the water pressure standard
3. The discussion of drivers for observed historical performance for dry weather overflows is very limited, lacking supporting evidence and appears to misrepresent the data

we conclude that Sydney Water has not yet adequately addressed the requirements of the reporting manual for the performance standards report. We therefore consider that this clause is non-compliant. We consider that this is non-material because we understand that Sydney Water does undertake this analysis and does use it to inform its decision making; it is just not included in the Reporting Manual in a meaningful way.

We do not make a recommendation for this non-compliance as it is already adequately captured in Recommendation 2020-22 which we consider is still open.

We also note that the report still contains discussion of various initiatives that Sydney Water is undertaking to improve service interruptions performance. However, the discussion of these initiatives typically has little critical analysis regarding the potential or actual influence of these initiatives on performance and appear to distract from the

intention of the performance standards report. We note that the 2019/20 audit identified that there was an opportunity for Sydney Water to consider whether removing this information would improve the reporting. We include the same opportunity for improvement in this year's report but note that there is no obligation for Sydney Water to act on opportunities for improvement.

Performance monitoring and reporting

This sub-clause requires that Sydney Water reports:

- Annually its Statement of Compliance by 1 September following the end of the relevant financial year
- Annually on status of any recommendations arising from the most recent Operational Audit and for past recommendations that are not fully implemented
- Annually against the performance and environmental performance indicators and the National Water Initiative performance indicators.

Sydney Water's Statement of Compliance has been provided to us and is dated 30 August 2020. The performance indicators and National Water Initiative reports have been provided to us.

Recommendation

10.2.2-1: We recommend by 30 June 2022 Sydney Water, ensures the Quarterly – Water Quality Monitoring Report – Drinking Water (the public water quality reports meets the requirements of the Reporting Manual to report each quarter on their performance against all health and aesthetic water characteristics and raw water operational characteristics identified in the Drinking Water Quality Management System.

Recommendation 2020-22 also applies to this clause.

Opportunities for improvement

OFI 10.2.2-1: We suggest that Sydney Water should only report on potential future initiatives in the Performance Standards Reports when it is considered sufficiently material to impact future performance. If Sydney Water chooses to discuss future initiatives, we suggest it considers quantifying the extent of potential future trials or applications and their expected benefits such that they may be revisited in future years to assess whether the future initiatives achieved their expected benefits.

OFI 10.2.2-1: We suggest that Sydney Water engages with NSW Health to agree on the appropriate level of detail for the Annual Compliance Report (particularly for CCP reporting).

Clause 10.2.3

Table 2-29. Clause 10.2.3 compliance grade

Subclause	Requirement	Compliance grade
10.2.3	Sydney Water must: a) compile indicators of the direct impact on the environment of Sydney Water's activities (the Environment Performance Indicators). The Environment Performance Indicators must be consistent with the performance indicators specified in the Reporting Manual with an indicator number starting with 'E'; b) monitor and compile data on the Environment Performance Indicators, including data that allows a year to year comparison of the Environment Performance Indicators; and c) report on the Environment Performance Indicators in accordance with the Reporting Manual.	Non-compliant (non-material)

Risk	Target for full compliance
If Sydney Water does not report on its environmental impacts and performance then its environmental impacts will not be known accurately	Sydney Water compiles and reports data that is consistent with the Reporting Manual and indicator definitions

Summary of reasons for grade

We consider that Sydney Water is non-compliant with the requirements of this clause because identified errors mean that the accuracy of its reported data is not known with confidence. We consider that the non-compliance is non-material because only two data points were identified as erroneous from a small sample.

This clause is considered Non-compliant (non-material).

Discussion and notes

This clause requires that Sydney Water compile indicators of the direct impact on the environment of Sydney Water's activities, monitor and compile data on these indicators, and report on these indicators in accordance with the Reporting Manual. The data monitored and compiled must include data that allows a year-to-year comparison of these indicators.

These indicators must be consistent with those specified in the Reporting Manual that have an indicator number starting with the letter, "E". These indicators are known as the Environment Performance Indicators.

Environment Indicators Performance Report

Sydney Water reports its performance against the Environmental Performance Indicators in an annual performance report, Environment Indicators Performance Report 2020-21. We reviewed the indicators included in the Environment Indicators Performance Report 2020-21 and confirmed that these are consistent with those specified in the Reporting Manual that have an indicator number starting with the letter, "E". Under its Reporting Manual, Sydney Water is also required to include data that allows a year-to-year comparison of the Environmental Performance Indicators. We

confirmed that, for each indicator, annual data from 2016/17 is included in the Environment Indicators Performance Report 2020-21, and commentary on annual trends is provided.

We also sighted a letter from the Managing Director, Sydney Water to the Chief Executive Officer, IPART on 1 October 2021 that confirmed the submission of the Environment Indicators Performance Report 2020-21. We confirm that this meets the requirement of the Reporting Manual for Sydney Water to submit the Environment Indicators Performance Report to IPART by 1 October following each financial year.

Process to report data

Sydney Water advised that it defines and interprets each indicator in the respective "folio of progress". As evidence, Sydney Water provided to us the folios of progress for the waste indicators (IPART E6 and E7 indicators) and flora and fauna indicators (E8, E9 and E10). We reviewed the definitions and interpretations included in these folios and confirmed that these are consistent with those specified in the Reporting Manual, where available.

The folios of progress also specify the following information:

- Primary and secondary contacts responsible for monitoring and reporting performance against the indicators
- Relevant Ministerial, Operating Licence, Customer Contract and Reporting Manual requirements
- Documents to validate information within the folio.

However, the "Documents to validate information within this folio" section (Section 2) of the waste folio of progress appears to be an erroneous copy and paste from the flora and fauna folio of progress.

Sydney Water advised that the data for each indicator is collated within the respective folio each year. Sydney Water also advised that this data is prepared and reviewed by the secondary contact for the indicator, and that each data provider has "quality processes embedded in their business". Sydney Water further advised that the collated data is then signed off by the Heads of Business.

Sydney Water has in place an Environmental Management Monitoring and Measurement plan (document number SWEMS0010, Version 19). This plan documents the task details for monitoring and measurement activities (including responsibilities, frequencies, measures and outputs), accountabilities, training and competencies, document ownership and change history. The plan was last issued on 14 May 2021.

At audit we asked Sydney Water to demonstrate some of the processes it uses to capture and report environmental data. We trailed reported data for E10, the total area of native vegetation gain due to rehabilitation, replanting, weeding and protection (ha) and asked Sydney Water to provide evidence to support the area claimed for one of the largest revegetation records, Johnstons Creek. Sydney Water investigated and advised following the audit that the reported area of revegetation was erroneous due to incorrect information being input by the contract and not being picked up by Sydney Water.

We also trailed reported data for E6 percentage of solid waste recycled or reused. We observed that high proportions of asbestos waste were reported as being recycled. Sydney Water investigated this and advised following the audit that the reported volumes of recycled asbestos were erroneous due to incorrect information being input by the contract and not being picked up by Sydney Water.

These two errors identified were selected at audit from a very small number of indicators tested. They were selected non-randomly and based on obvious characteristics. Therefore, they are not likely to be representative of the prevalence of errors in the wider population of reported environmental indicators. However, it cannot be overlooked that these errors were identified with relative ease and are material to the reported numbers, noting that they have been corrected for the 1 October Environmental Indicators Report.

We consider that the observed errors mean that Sydney Water is non-compliant with the requirements of this clause because the accuracy of its reported data is not known with confidence. We consider that the non-compliance is non-material because only two data points were identified as erroneous and these have subsequently been corrected in the official report.

Sydney Water responded to the draft report that it considers that the errors identified do not constitute a non-compliance because they were due to human oversight and only two errors were identified. We acknowledge that the errors are few relative to the total: 2 out of 25, but as noted, the 2 were identified in only a small sample of the 25 total. Further, while the root cause may have been human error, the reporting of incorrect information is evidence of other failures including data owner review, quality assurance checks and manager approval of reported data. Based on these multiple failures of the reporting process, we still consider that a non-compliant grade is appropriate for this clause.

Recommendation

Recommendation 10.2.3-1: By 30 June 2022, we recommend that Sydney Water conducts an internal audit of its reported environmental data to provide assurance that the data is accurate and in accordance with the reporting definitions.

Opportunities for improvement

No opportunities for improvement have been identified

3 Previous Recommendations

Recommendation 2019-01: Water Quality (Drinking water) clause 2.1.1

Item	Detail
IPART's recommendation to the Minister	By 30 June 2020, establish a documented procedure for evaluating the chlorine solution used in the networks maintenance activities and for evaluating the associated supplier(s).
Progress on 2020 audit findings as reported by utility on 31 May 2021	This recommendation remains open and should be checked for completion at the next operational audit.
IPART guidance	Auditor to check for completion
Audit finding	The procedure Quality Assurance of Hypochlorites (WPIMS5175, Version 9 dated 11/6/2021) was updated in 2020 to include the use of sodium hypochlorite (1%) pipe sanitiser. The procedure documents an approved supplier of the chemical and QA testing requirements. The procedure requires detailed QA testing to be undertaken on two batches per calendar year by the supplier. There is also an audit on the quality of sodium hypochlorite to be undertaken twice annually. The analysis and reporting requirements are specified in the Appendices of the procedure. The QA form (Appendix 2) has a field for the nature of the sample which include pipe sanitiser and the Laboratory test results have a criteria for pipe sanitisers of 0.5 to 3 %w/v.
Recommendation status	This recommendation is closed

Recommendation 2020-01: Licence and licence authorisations (Pricing) clause 1.7.1

Item	Detail
IPART's recommendation to the Minister	By 28 February 2021 (in advance of the updating of charges for the next financial year), Sydney Water must review its operating procedures to ensure that they reflect the requirements relating to any uplift charges for the Sydney Desalination Plant (noting that the 1 July 2020 Determination has different mechanisms for the uplift charge) and update these procedures as required. Sydney Water should also raise awareness around uplift charging requirements for relevant staff, where appropriate.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: Completed Sydney Water reviewed and updated its Implementing the drought uplift water usage charge procedure (SWIM #2905867 on 18 Feb 2021) to ensure that it reflects the requirements relating to any uplift charges for the Sydney Desalination Plant. A brief training session is planned for relevant members of the Billing team to ensure awareness of the uplift charging requirements.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water has developed an Implementing the drought uplift water usage charge procedure (SWIM 2905867, Version 1). This procedure documents the process and task details for implementing the drought uplift water usage charge, definitions, accountabilities, training and competencies, document ownership, and change history. The procedure was approved for issue by the Head of Business, Customer Programs on 18 February 2021. We confirmed that the criteria for triggering and ceasing the drought uplift water usage charge, as documented in the associated procedure, reflect the 2020 – 2024 determination made by IPART. Sydney Water advised that it held a training session for the Billing and Revenue Team on 26 May 2021 to raise awareness of the new procedure. Sydney Water provided to us the attendance list for the training session, along with the PowerPoint presentation used. Sydney Water also provided to us the price list for 2020-21 (SWIM 2946730_ Price path - 2020-21 Final with 5 DP_ signed_20200619.xlsx), which includes the "Uplift on Drought Response Days" water usage charge. This price list was checked, endorsed and approved by Sydney Water, with endorsement and approval provided at managerial levels. We confirmed that the drought uplift water usage charge in the 2020-21 price list reflects the 2020 – 2024 determination made by IPART. Based on our findings above, we consider this recommendation to be complete.
Recommendation status	This recommendation is closed

Recommendation 2020-02: Economic approach for water conservation (water conservation program) clause 3.1.1

Item	Detail
IPART's recommendation to the Minister	Sydney Water must update the Water Conservation Report to include more information on the development, delivery and monitoring of the program. This should include more information on how projects are first identified from the wide range of potential options, assessment of project effectiveness and monitoring of benefits. Sydney Water must develop the structure of this report and content to be included in time for the next water conservation report for the 2020-21 year.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track The structure of the 2021 Water Conservation Report has been developed and reviewed by the Internal Audit team (as part of an internal audit) to ensure that it meets these requirements. Due dates (as proposed by Sydney Water) 31 March 2021 – Water Conservation Report structure 1 September 2021 – Submission of Water Conservation Report for 2021 (Part of Annual Statement of Compliance report)
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water has updated the structure and content of its Water Conservation Report to include additional information on the pathways for projects to be identified and progressed. To this end, Sydney Water has developed several mechanisms for the identification of projects – a Sydney Water innovation platform, an expression of interest form, and targeted workshops led by the Research and Innovation Team. In its Water Conservation Report: 2020 – 2021, Sydney Water states that it also "participates in several industry associations and works in collaboration with Government and standards committees in order to learn, share and combine efforts". Once projects are identified, they are categorised as "research and innovation", "early lifecycle" or "established programs". Sydney Water has also established a Water Conservation Portfolio Control Board that is responsible for monitoring performance, providing strategic advice and direction, resolving issues, and ensuring appropriate reporting of outcomes. However, the criteria for projects to progress from "research and innovation" to "early lifecycle" and "established programs" are not clear. It is also not clear from the Water Conservation Report whether the "research and innovation" and "early lifecycle" projects meet the economic level of water conservation and, if not, how the benefits of these projects are evaluated before commencement. Further, the Water Conservation Report has little detail on the assessment of potential initiatives and monitoring them from identification to delivery. The intention of this recommendation was to provide emphasis on areas where it was considered that the Water Conservation Report for 2019/20 did not meet the requirements of Sydney Water's Reporting Manual. That is, the recommendation is intended to complement the Reporting Manual requirements relating to the Water Conservation Report. While we recognise that Sydney Water has made significant progress in making its

Item	Detail
	Water Conservation program more robust and consistent with the requirements of the Reporting Manual, this is currently not reflected in the Water Conservation Report. We queried Sydney Water at audit regarding the level of detail in the Water Conservation Report. Sydney Water responded that it was its intention was to make the report a high-level customer-facing document. However, the Reporting Manual (supported by this recommendation) make clear that more detailed information should be reported. Sydney Water has not provided all of the detail expected in the Reporting Manual within the Water Conservation Report. Therefore, while Sydney Water has made progress, we don't consider that the recommendation has been fully addressed at this time.
Recommendation status	We conclude that this recommendation is ongoing. The next appropriate date to test this recommendation is submission of the 2021/22 Water Conservation Report.

Recommendation 2020-03: Economic approach for water conservation (water conservation program) clause 3.1.1

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must demonstrate measures that have been taken in the 2020-21 financial year to improve its systems and processes used to deliver the water conservation program, including program monitoring and corrective action processes.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track Clear documentation has been developed to support delivery of the Water Conservation Program, including: • water conservation Project Control Board minutes • 2020 water conservation program review report • Executive and Board papers and decision making processes.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water has established a Water Conservation Portfolio Control Board that is responsible for monitoring performance, providing strategic advice and direction, resolving issues, and ensuring appropriate reporting of outcomes. The Water Conservation Portfolio Control Board is supported by three working groups – the networks and system leakage working group, the water efficiency working group, and the recycled water leadership group. Sydney Water advised that the Water Conservation Portfolio Control Board and supporting working groups meet on a monthly basis. Sydney Water provided to us example minutes from Water Conservation Portfolio Control Board meetings held in the audit period. However, it is not clear from the minutes how the Water Conservation Portfolio Control Board monitors the performance of the water conservation program in a consistent and structured manner, and ensures that consistent, justified and transparent decisions are made in line with a documented decision-making framework. Since the audit period, Sydney Water has commenced the development of a governance process for the Water Conservation Innovation Fund. However, this occurred outside of the audit period. Sydney Water conducted a mid-year review of the 2020-21 water conservation program in December 2020. The mid-year review identified several recommendations, including proposed changes to the 2020-21 water conservation program budget following a review of the forecast year-end expenditure against the original budget. We consider that the establishment of the Water Conservation Portfolio Control Board and related governance as well as the mid-year review demonstrate that Sydney Water has taken action to improve monitoring and corrective actions for the Water Conservation Program. Therefore, we conclude that this recommendation is complete. We note that these activities need to be made part of business as usual to meet the requirements of the Reporting Manual.
Recommendation status	This recommendation is closed.

Recommendation 2020-04: Economic approach for water conservation (water conservation program) clause 3.1.2

Item	Detail
IPART's recommendation to the Minister	Sydney Water must identify, assess, and include where appropriate measures for reducing leakage to below the economic level within its water conservation program. This should be completed for inclusion in the 2021-22 water conservation program.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track Funding has been allocated to leak detection initiatives from the water conservation budget. In February 2021, the Executive approved continued funding of active leak detection above the historical rate (pre 2019-20) despite increased dam levels, to enable protection of water supply water to meet increased customer demands due to growth. The increased active leak detection is part of a program of work developed to bring leakage to within the ELL, which will be implemented as part of the Water Leakage Plan.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water has updated the structure and content of the Water Conservation Report to include additional information on its water leakage plan, as well as leakage management initiatives that are either "established programs", "early lifecycle projects" or "research and innovation". Sydney Water advised that it has allocated funding from the water conservation program budget to leakage management initiatives. For example, the Water Conservation Report 2020-21 states that $43,600 was funded from the water conservation program to repair the Catalina and Lawson Reservoirs in 2020-21. This initiative is categorised under the "asset management" sub-program of Sydney Water's leakage management program. In its Leakage Management Plan 2021 (document number AMQ0057, Version 4), Sydney Water clarifies that these concrete reservoirs were experiencing leakage through wall joints and/or cracks. A further $70,000 has been assigned to the asset management sub-program of the leakage management program for 2021/22. During the audit, Sydney Water clarified that this expenditure also relates to reservoir repairs to prevent ongoing leakage. Sydney Water also clarified that the economic level of water conservation is not applied to general renewals, as renewals may be driven by primary factors other than leakage. Sydney Water advised that the pressure management initiatives marked with a "TBA" in Table 3-3 of the Water Conservation Report 2020-21 reflect the status of a study that is currently being undertaken by an external consultant to identify best-value opportunities for pressure management. We note that the Water Conservation Report 2020-21 does not include document control information, such as a version number, version date, change history, document author, document reviewer or document approver. However, the Leakage Management Plan 2021 does include document control information and was last issued on 31 March 2021. We conclude that Sydney Water has demonstrated that it has assessed, and included, measures for reducing leakage below the economic level within its Water Conservation Program. However, the inclusion of leakage is relatively immature with pressure management lacking detail awaiting further investigation and expenditure only committed to Active leakage control beyond 2021/22. Therefore, while we conclude that this recommendation is closed, we note that Sydney Water needs to

Item	Detail
	make inclusion of leakage within the Water Conservation Program part of business as usual.
Recommendation status	This recommendation is closed

Recommendation 2020-05: Drinking water clause 4.1.1

Item	Detail
IPART's recommendation to the Minister	By 31 March 2021, Sydney Water must document the scope of the drinking water annual operational risk assessment reviews, and ensure a NSW Health representative is present during assessment of public health risks.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: Completed Discussed and agreed in principle with NSW Health. Comments from NSW Health were incorporated into the IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water. The SOP includes: • detailed scope of the drinking water annual operational risk assessment reviews, including the requirement to invite NSW Health to the annual reviews • triggers for detailed risk assessment for focus areas in drinking water • scope of detailed risk assessment for focus areas in drinking water.
IPART guidance	Auditor to check for completion
Audit finding	NSW Health advised Sydney Water (email: 2/12/2020) it was satisfied with Sydney Water's progress in addressing this audit recommendation regarding NSW Health's involvement with drinking water annual operational risk assessment reviews. Sydney Water advised that comments from NSW Health were incorporated into the IMS-Operational Risk Assessment Workshop (KnowRisk Review) Procedure. The procedure includes: • detailed scope of the drinking water annual operational risk assessment reviews, including inviting NSW Health to the annual reviews • triggers for detailed risk assessment for focus areas in drinking water • scope of detailed risk assessment for focus areas in drinking water NSW Health attended the Operational Risk Reviews completed during the audit period.
Recommendation status	The recommendation is closed.

Recommendation 2020-06: Drinking water clause 4.1.1

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must review the Corporate Risk Matrix to rectify inconsistencies between Public Health and Injury / Illness consequence descriptors, including liaison with NSW Health.
Progress on 2020 audit findings as reported by utility on 31 May 2021	On track Public health consequence descriptors are being reviewed to update examples of historical water quality incidents and remove references to the number of illnesses/fatalities. Examples have been updated to focus on the number of people exposed to unsafe water. Examples for public health and illness/injury are being re-aligned. The Risk and Water Quality teams will produce a slide package to explain how the categories are applied to guide the implementation in risk assessments.
IPART guidance	Auditor to check for completion
Audit finding	Examples relating to public health descriptors have been updated to align with the Public Health consequences in the Corporate Risk Matrix. Sydney Water have agreed with NSW Health to undertake a more holistic review of the Public Health descriptors and involve NSW Health in this review. NSW Health noted (1/7/2021) that Sydney Water committed to review the public health consequence descriptors in consultation with NSW Health and are targeting January 2022 for implementation of a new matrix. NSW Health's letter in response to request for comments on Sydney Water's performance against its Operating Licence during the 2020-21 noted it was satisfied with the approach and suggested timeline but noted that the 2019-2020 audit recommendation will not be complete by 30 June. NSW Health confirmed by email 6/9/2021 that this applied to recommendations 2020-06 and 2020-07. The auditor is satisfied that Sydney Water is progressing this recommendation.
Recommendation status	We found this recommendation is overdue and recommend it remain open

Recommendation 2020-07: Drinking water clause 4.1.1

Item	Detail
IPART's recommendation to the Minister	By 31 March 2021, Sydney Water must formalise the process for how the updated risk matrix and risk procedure is being implemented across water supply systems, including resolving inconsistencies in superseded documentation references, particularly noting the IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water procedure.
Progress on 2020 audit findings as reported by utility on 31 May 2021	Completed The drinking water facility-based operational risk assessment workshops held in 2019 used the Corporate Risk Matrix of that time. For consistency and continuity, the same risk matrix was used for the 2020 annual risk reviews and will be used for 2021 risk review, as the complete risk assessment is only completed on a 3-yearly basis. The current Corporate Risk matrix will be used for the 2022 Operational Risk Assessments. The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water has been updated with current documentation references.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water advised the Corporate Risk Matrix of that time was used for the 2019 drinking water facility-based operational risk assessment workshops. For consistency and continuity, the same risk matrix was used for the 2020 annual risk review. In the 2021 risk reviews the new Corporate Risk matrix was used as it had been incorporated into KnowRisk. The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water has been updated with the appropriate document references and consulted with NSW Health. Sydney Water advised the updated SOP addressed NSW Health's review comments. Sydney Water advised that the current Corporate Risk matrix will be used for the 2022 Operational Risk Assessments. The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water has been updated with current documentation references. NSW Health's letter in response to request for comments on Sydney Waters performance against its Operating Licence during the 2020-21 noted it was satisfied with the approach and suggested timeline but noted that the 2019-2020 audit recommendation will not be complete by 30 June. NSW health confirmed by email 6/9/2021 that this applied to recommendation s 2020-06 and 2020-07. We are satisfied that Sydney Water has been progressing this recommendation, however as there is a requirement in the recommendation for implementing the updated risk matrix, we consider this recommendation open.
Recommendation status	This recommendation is open

Recommendation 2020-08: Drinking water clause 4.1.3

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must establish processes for identifying and actioning improvement items identified in risk assessments to ensure timely resolution. After Sydney Water has established these processes, update the Product Management Improvement Framework.
Progress on 2020 audit findings as reported by utility on 31 May 2021	On track The IMS-Operational Risk Assessment Workshop (KnowRisk Review) SOP for Drinking Water includes criteria used as a guiding principle for decision making in regard to actions to be included in the improvement plan and the prioritisation of those actions. The Product Quality Improvement Framework is being updated by the Water Quality team to address this action and incorporate additional feedback in relation to recycled water.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water is progressing the development of a Consolidated Action Plan to collate the actions from the risk assessments and track their progress.
Recommendation status	This recommendation is open.

Recommendation 2020-09: Recycled water clause 4.2.1

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must document the procedure for undertaking annual recycled water operational risk assessment reviews.
Progress on 2020 audit findings as reported by utility on 31 May 2021	On track A review of recycled water performance will be added to the annual operational performance review process and the procedure updated.
IPART guidance	Auditor to check for completion
Audit finding	The Recycled Water Risk Assessment Workshop Standard Operating Procedure (SOP) (D000681dated May 2021) has been updated to include the latest risk management procedures, changed responsibilities for governance and assurance. The SOP has also been updated to include reviews of the risk register (KNOWRISK) for each water recycling scheme. The SOP was issued on BMIS on 30/6/21. The change control table in the SOP has the latest revision as Version 3 dated May 2021 however the footer in the document refers to Version 1 dated 16/3/2020.
Recommendation status	Complete

Recommendation 2020-10: Recycled water clause 4.2.1

Item	Detail
IPART's recommendation to the Minister	By 31 March 2021, Sydney Water must ensure risk assessment documentation (including workshop reports and the operational risk assessment procedure) refer to the current Risk Management Procedure and Risk Matrix.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: Completed The risk workshop procedure (D0001681) has been updated to refer to the correct risk matrix and procedure.
IPART guidance	Auditor to check for completion
Audit finding	The Recycled Water Risk Assessment Workshop Standard Operating Procedure (SOP) (D000681 dated May 2021) has been updated to include the latest risk management procedures and refers to the Enterprise Risk Management Framework (819910) and the Risk Management procedure (1045159). The SOP also requires the risk assessment briefing paper and risk assessment report to identify the risk assessment methodology and risk matrix to be used. Sydney Water conducted a risk assessment workshop for the Rouse Hill Recycled Water Quality Management Plan (RWQMP) on 25 November 2020. The draft of the Risk assessment Report - Rouse Hill RWQMP (17/8/21) includes a description of the risk assessment methodology including reference to Sydney Water's Risk Management Process (Guideline A: Risk Management Process (QMAF0081) and a brief description of the steps in the risk assessment process.
Recommendation status	Complete

Recommendation 2020-11: Recycled water clause 4.2.1

Item	Detail
IPART's recommendation to the Minister	By 30 September 2021, Sydney Water must update critical control point documentation for the audited WRP to document the basis for the CCT low flow critical control point
Progress on 2020 audit findings as reported by utility on 31 May 2021	On track The West Camden Recycled Water Quality Management Plan (RWQMP) is currently being reviewed and the Chlorine Contact Tank (CCT) low flow setpoint will be reviewed as part of this process.
IPART guidance	Auditor to check for progress
Audit finding	Sydney Water advised it planned to review the CCT low flow setpoint during the review of the West Camden RWQMP. This was originally scheduled to be completed by 30 September 2021. However, the impact of COVID-19 restrictions has delayed this review particularly the sampling required to verify the log reduction values (LRVs). Sydney Water's revised timeframe for review of the West Camden RWQMP is December 2021. Sydney Water advised that the CCT low flow setpoint is to protect pumps and should not be a critical control point (CCP). It is not related to recycled water quality and Sydney Water propose to remove it as a CCP.
Recommendation status	This recommendation remains open and should be checked for completion at the next operational audit.

Recommendation 2020-12: Recycled water clause 4.2.1

Item	Detail
IPART's recommendation to the Minister	By 31 December 2021, Sydney Water must update scheme specific referencing in recycled water quality management plans that are scheduled for review in the next audit period to include reference to scheme specific documentation, including the audited Recycled Water Quality Management Plan. Include an action in the Recycled Water Improvement Register to update all scheme specific plans with this information at their scheduled review.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track The structure of information in the Recycled Water Manual and individual Recycled Water Quality Management Plans are being reviewed to remove duplication and to focus individual scheme specific plans on scheme specific documentation. This process will be added to the Recycled Water Improvement Register and updates will progress as part of the four-yearly review cycle. A review of the West Camden RWQMP is in progress.
IPART guidance	Auditor to check for progress
Audit finding	Sydney Water advised that no RWQMP updates have been completed in the audit period. The review of Rouse Hill RWQMP is in progress and West Camden RWQMP review is on hold due to the need for repeat sampling that cannot be completed due to COVID-19 restrictions. Sydney Water advised that Rouse Hill RWQMP will be the first to be updated with scheme specific referencing. Action RW128 to streamline the RWQMPs in the Sydney Water Recycled Water Improvement Plan on 1 July 2021.
Recommendation status	This recommendation remains open and should be checked for completion at the next operational audit.

Recommendation 2020-13: Recycled water clause 4.2.1

Item	Detail
IPART's recommendation to the Minister	By 31 December 2021, Sydney Water must update the recycled water audit schedule to ensure an annual review of high risk AGWR elements at a number of recycled water schemes each year (as agreed with NSW Health). The schedule should be risk-based and consider locations and exposures. All recycled water schemes should be audited within a 3-year cycle
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track • Criteria for prioritising recycled water schemes based on risk have been developed • All recycled water schemes have been ranked based on the prioritisation criteria and an audit schedule has been developed • The proposed audit schedule will be presented at the Joint Operational Group (JOG) in May 2021 to engage with NSW Health and seek their agreement to the risk based schedule • A quotation from an external SME has been sought to conduct the audits. This will provide an independent assessment. • Audits are scheduled to commence in Quarter 1 of 2021-22 (1-2 schemes/quarter)
IPART guidance	Auditor to check for progress
Audit finding	Sydney Water have developed a spreadsheet with the following criteria for prioritising recycled water scheme audits: • Number and priority of improvement plan actions that are open • Number and priority of residual risk from recycled water risk assessments • Number of incidents and hazards in 2020-21 Based on these criteria a judgement was made to prioritise the scheme audits and they were scheduled with all other audits in Sydney Water's quality management system. The criteria and proposed audit program presented to JOG in May 2021 While Sydney Water were able to explain the process to prioritise audits in the interviews, there is currently no procedure for how the criteria are applied.
Recommendation status	This recommendation remains open and should be checked for completion at the next operational audit. Sydney Water should prepare a procedure to document how the audits are prioritized.

Recommendation 2020-14: Recycled water clause 4.2.1

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must review and update the Product Management Improvement Framework to explicitly reference recycled water. Establish processes for identifying and actioning action items in risk assessment to ensure timely resolution and update the Product Management Improvement Framework.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track The Product Management Improvement Framework is currently being reviewed to address the areas specified in the recommendation.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water has replaced the Product Quality Improvement Framework with the Product Quality Improvement Procedure (BMIS0214, dated 30/6/21). This procedure references the Recycled Water Management System. The procedure incudes a process map where the first step is to collate areas for improvement and the details of this step include gathering inputs from a number of sources including product risk assessments. Guidelines are also provided with criteria for prioritising improvement ideas. Minutes of Product and Asset Management Forum (PAMF) meeting on 17/3/21 included progress on recycled water improvement plan actions on the agenda. This meeting was attended by product and asset managers. The Product Quality Improvement Procedure was presented to the Joint Operational Group meeting on 12/5/21.
Recommendation status	Complete

Recommendation 2020-15: Recycled water clause 4.2.3

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must review permissions and limits in SCADA to ensure that changes outside critical limits can only be made in accordance with an appropriate change management procedure and that critical limits align with the critical control point documentation for all plants.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track A business case and scope of work (covering both aspects of the recommendation) has been developed, including implementation by Digital - Operational Technology Programs to physically prevent critical limits being changed outside Critical Control Points (CCPs). Interim administrative procedure and training to be undertaken.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water has advised this action was not completed by 30 June 2021 due to underestimation of the approvals required and the timing needed to complete SCADA changes. The following progress has been made on the action: • Defining the scope of work required for each plant with the process engineers in the Water Resource Recovery team and SCADA programmers • Implementing change management processes to manage risk • Working with the Operational Technology SCADA programming team to determine the project schedule • Writing of business case and approval of funding to complete the work (project #20038981) • Determining how to implement the SCADA changes remotely, to minimise Covid risks to location critical workers. A business case for the SCADA changes (dated 17/5/21) and a project program (dated 27/8/21) was provided and Sydney Water has advised the updated completion date is January 2022. Sydney Water have advised that as an interim measure, the Process Controllers have reviewed the critical limit setpoints for all schemes to ensure setpoints are not outside CCP limits and will continue to review this regularly until the SCADA changes are completed. The following evidence of progress on this action for Liverpool Water Recycling Plant was provided including: • Plant Modification Request Form for upgrades to SCADA for critical control points (dated 08/6/21) • Hazard Identification Risk Assessment (HIDRA) of the SCADA upgrade (dated 16/6/21)
Recommendation status	This recommendation remains open and should be checked for completion at the next operational audit

Recommendation 2020-16: Recycled water clause 4.2.3

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must formalise the review of the recycled water verification report, to be explicit about the need to manually check that exceptions are included in the Irrigation Scheme Monthly reports, and train staff in the updates.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: Completed The procedure (Recycled Water Reporting Work Instruction - MP0021) has been updated and training completed.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water updated the IMS Work Instruction for Recycled Water Reporting (MP0021) on 30/10/2020 to include manual checking of the BI reports used for quarterly reporting against the monthly exceedance reports. Sydney Water provided a training matrix which shows three staff assessed as competent in all components of this work instruction. While some discrepancies were found in the first and second Quarter 2020-21 Recycled water quality monitoring reports and the July to December 2020, there were no discrepancies in the third and fourth quarterly report since the work instruction was revised and staff were trained.
Recommendation status	This recommendation is closed

Recommendation 2020-17: Water continuity standard clause 5.1.1

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must provide updated analysis of its understanding of the relationship between prevailing weather conditions in the last five years, soil moisture and the impact on water main bursts, leaks and unplanned supply interruptions.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track Previous studies have been collated to determine new work scopes for investigation concerning the impacts of weather changes and soil moisture on the Sydney Water network. A paper summarising the findings is being prepared and will provide input into relevant programs including the Leakage Management Program.
IPART guidance	Auditor to check for completion
Audit finding	In its Operating Licence 2019-2023 Compliance and Performance report: Performance Standards for Service Interruptions Report 2020-21, Sydney Water has summarised the results of an analysis undertaken to compare soil moisture at 0.1 metre – 1 metre depth with the total number of breaks and leaks. The data was collated at monthly intervals from July 2016 to May 2021. The analysis illustrated an inverse relationship between soil moisture and the number of breaks and leaks. Sydney Water has also developed a Climate Impacts Guide: Links to Asset Performance and Programs (SWIM 2947670, Version 1). The purpose of this document is to "provide a guide of climate/weather-related information and historical comparisons of internal Sydney Water programs, to assist work/program forecasters in organising resources and crews to enable customer and community services to be achieved". The document summarises key lead indicators such as soil moisture and the Southern Oscillation Index, rainfall across Greater Sydney, and resulting impact patterns relating to water and wastewater performance indicators. The Climate Impacts Guide: Links to Asset Performance and Programs also includes document control information (document ownership, change history and document review). The document was last issued on 30 June 2021 and is due for review on a biennial basis or as new data types or analysis become available. Based on our findings above, we consider this recommendation to be complete.
Recommendation status	This recommendation is closed

Recommendation 2020-18: Water continuity standard clause 5.1.1

Item	Detail
IPART's recommendation to the Minister	By 31 December 2021, Sydney Water must complete lessons learned reports for the five largest unplanned water supply interruption events that occurred in 2019-20 and identify what measures could be implemented in future to reduce the number of properties impacted by future interruptions at these locations. Sydney Water should demonstrate how it has considered the application of these lessons learned across its entire network.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track A team was assembled in February 2021 to conduct the investigations. A pre-investigation information template was circulated to gather factual information about the incidents in preparation for the face to face workshops. Half-day workshops have been scheduled over May to early June 2021 to conduct the investigations. Root cause analysis will be undertaken to help identify measures to mitigate the incidence or impact of future interruptions and common findings/ lessons learned that can be applied to the broader network
IPART guidance	Auditor to check for progress
Audit finding	Sydney Water has prepared a Lessons identified: Water continuity incidents in 2019-20 report (SWIM 2947672). This report documents the drivers for undertaking a lessons learned review, the common themes across the incidents investigated, and the lessons learned and recommendations. The scope of the report comprises the five unplanned water interruptions impacting the most customers in 2019/20. A "squad" of 10 staff from across Sydney Water were selected to undertake and provide input into the review. We note that the report is a work in progress but appears to be on track for completion by the recommendation due date (31 December 2021). We also note that this report does not include document control information, such as the names of the author and reviewer, the version number, and the date on which the report was authored or reviewed. We recommend that this information is included in the finalised report. Sydney Water also provided to us an example completed incident investigation template (SWIM2947671 - WO79279385 Hermitage Remainder Incident Investigation.docx) and an example attendance list for a series of incident investigation workshops (SWIM2947671 - WO79279385 Hermitage Remainder Incident Investigation.docx). Based on our findings above, we consider this recommendation to be on track for completion by the recommendation due date (31 December 2021).
Recommendation status	This recommendation is on track for completion by the recommendation due date (31 December 2021)

Recommendation 2020-19: Water pressure standard clause 5.2.5

Item	Detail
IPART's recommendation to the Minister	By 31 March 2021, Sydney Water must update its business process manual to fully and accurately include low pressure clusters.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: Completed The business process manual (Sydney Water Tap in™ - Processing a Water Connection Staff Guide - SWIM Doc # 1260446) has been updated to fully and accurately reflect low pressure clusters.
IPART guidance	Auditor to check for completion
Audit finding	Sydney Water advised that it has undertaken a review of the low-pressure clusters defined in its operating licence. As a result of the review, Sydney Water has updated Sydney Water Tap in™ Processing a water connection: Staff Guide (SWIM 1260446, Version 1.2) to include all six clusters defined in its operating licence. Sydney Water has provided the updated procedure to us. Based on our findings above, we consider this recommendation to be complete.
Recommendation status	This recommendation is closed

Recommendation 2020-20: Asset management clause 5.5.2

Item	Detail
IPART's recommendation to the Minister	By 31 December 2021, Sydney Water must review its inspection programs for all asset classes to incorporate lessons learned from its current inspection program for sewage pumping stations. The output should be an updated condition assessment strategy (or similar) document(s) that specifies the desired approach to condition assessment for all major asset classes including (but not limited to): • consideration of risk of asset failure and consequence of failure • frequency of inspection • level of inspection (visual v detailed inspection) and situations where more detailed inspections are warranted • inspection techniques • resourcing and support considerations such as access and shutdowns.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track A proposal for the review is currently being assessed. A new position has been created (Principal Civil Engineer) and recruitment is in the final stages. One of the responsibilities of this role is to assure the condition assessment of structural assets. In addition, we are proposing to engage a new Service Planning Analyst to monitor and coordinate all asset class condition monitoring programs.
IPART guidance	Auditor to check for progress
Audit finding	Sydney Water advised that it has appointed a Principal Engineer Civil Structures and a Service Planning Analyst. Additionally, Sydney Water advised that the newly appointed Service Planning Analyst is coordinating a project being undertaken by an external consultant to review Sydney Water's condition assessment process and identify improvements. This project is known as the "Improve Asset Condition Assessment" initiative. The Service Planning Analyst will also be responsible for coordinating and monitoring the ongoing condition assessment program. As evidence of the "Improve Asset Condition Assessment" initiative, Sydney Water provided to us an initiative summary sheet (Asset Condition Assessment Improvement i.pdf). This summary sheet documents the scope, benefits, milestones and methodology for implementing the initiative, as well as interdependencies with other internal groups and business units. We confirm that the scope of the initiative reflects the scope of this recommendation. We note that the initiative summary sheet does not include document control information. During the audit, Sydney Water provided to us a summary table of the individual short-term and medium- to long-term initiatives under its overarching condition assessment improvement initiative. This summary table is also documented in a Condition Assessment Improvements project plan (document number 2021_ETS 01, Version 1). The project plan was last issued on 10 June 2021. For each initiative, the summary table documents the scope of the initiative, underlying activities and target completion date. We note that the following initiatives are scheduled for completion by the recommendation due date (31 December 2021):

Item	Detail
	1. Condition assessment of high-risk sewage pumping station civil assets 2. Development of a condition assessment standard 3. Condition assessment system review by Aurecon and Arup. This review includes the review and recommendation of a condition assessment system and program for all asset classes, gap assessment of the condition assessment process, development of a condition assessment framework, and development of an implementation plan to improve the condition assessment process. 4. Addressing of backlog actions identified by the condition-based asset valuation (CBAV) condition assessment program 5. Development and piloting of a condition assessment process for linear civil assets within treatment plants. This process is to be piloted at the Penrith Wastewater Treatment Plant. We consider that initiatives 2 and 3 of the above fall within the scope of this recommendation. Therefore, we consider that the initiatives comprising this recommendation are scheduled for completion by the recommendation due date (31 December 2021). With regards to the content of the initiatives that are underway and within the scope of this recommendation, Sydney Water advised that the new condition assessment standard will identify the desired condition assessment approach (e.g., run to failure) for each asset group it manages, with inspection frequencies determined based on the selected condition assessment approach. Sydney Water advised that it has also undertaken failure modes, effects and criticality analyses to inform the condition assessment standard. As evidence of the work completed to date, Sydney Water provided a draft Condition Assessment Requirements for Civil Structures (SPS) guideline. For each level of inspection (Level 1, Level 2 or Level 3), this guideline specifies the desired inspection frequency based on asset type and consequence of failure. We note that the guideline does not include document control information, such as a version number, version date, change history, document author, document reviewer or document approver. We recommend that this information is included in the finalised version. Sydney Water has also undertaken a lessons learned review of the high-profile failure that occurred at the Northmead sewage pumping station (SP0103) in 2018/19. The results of the lessons learned review are documented in the Northmead Lessons Learned: Final Report, issued on 9 July 2021. This report documents the context of the failure, staff involved in reviewing the lessons learned, key lessons learned, Level 1 and Level 2 inspections undertaken following the failure and lessons learned review, and agreed actions (including timeframes and responsibilities).
Recommendation status	On track

Recommendation 2020-21: Reporting clause 10.2.2

Item	Detail
IPART's recommendation to the Minister	By 31 March 2021, Sydney Water must ensure that all information required for annual compliance reporting is provided, including: critical control breaches for all plants, whether automated or manually monitored; assessment of the performance of critical control points over the long-term; and the proposed water quality management activities and programs, including expected outcomes, scope and timetable for completion.
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: Completed Compliance reports for drinking water and recycled water will be reviewed and updated for 2020-21 and include the items recommended by the auditor.
IPART guidance	Auditor to check for completion
Audit finding	The Annual Recycled Water Quality Compliance and Performance Report 2020-2021 included a table showing there were not critical control point breaches for any plant. Discussion on the performance of critical control points over the long-term was limited to exceedances only. This is discussed further in clause 10.2. A table of the proposed water quality management activities and programs, including expected outcomes, scope and timetable for completion was included in the report.
Recommendation status	This recommendation is closed

Recommendation 2020-22: Reporting clause 10.2.2

Item	Detail
IPART's recommendation to the Minister	Sydney Water must include detailed and quantitative discussion regarding the drivers for observed performance and variances to historical performance for all Performance Standards in the Performance Standards Report. This should be implemented for the next Performance Standards Report which will be for the 202021 year. Under Sydney Water's Reporting Manual, the Performance Standards Report is due for submission by 1 September following the end of the relevant financial year (i.e., 1 September 2021).
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track A component on this work is linked to Recommendations 2020-17 and 2020-18, which are currently in progress. Investigations for recent main breaks (water and wastewater) that have occurred throughout March and April 2021, will also be assessed as completed and any findings linked to the performance standards will be included in our 2020-21 Performance Standards Reports.
IPART guidance	Auditor to check for completion

Audit finding	The intent of this recommendation is to bring attention to the requirements in the Reporting Manual relating to the content of the annual performance standards report for service interruptions and in particular, the two requirements on Sydney Water to explain its performance:
	• An explanation of how Sydney Water has met or failed to meet the performance standards for service interruptions, which details:
	  • Major factors (both positive and negative) that have influenced Sydney Water's performance, including factors that are both within and beyond Sydney Water's control; and
	  • Reasons for any significant variation (both positive and negative) between Sydney Water's performance in the financial year and performance in the previous five years.
	This recommendation was made in response to this information being found to be insufficient in the 2019/20 audit.
	We reviewed the 2020-21 performance standards report. We found that Sydney Water has increased the discussion included within this report of factors that have influence the observed performance. However, we found the discussion to be generally at a high level. We acknowledge that both positive and negative factors have generally been discussed but the Reporting Manual also requires Sydney Water to discuss factors that are within and beyond its control and this discussion is lacking.
	Regarding the second requirement of the report to detail reasons for any significant variance in performance between the current year and the previous five years, we note that:
	• Water continuity – the report includes a chart comparing the current year with the previous five years. There is also further analysis and discussion regarding the impact of soil moisture content (although this only includes the current year and four preceding years, not five) and main size.

Item	Detail

	• Water pressure – the report does not include a comparison of the current year with the last five years because it is noted that the reporting definition changed with the introduction of the new Operating Licence in 2019. Nevertheless, as this is the second year of reporting under this definition, we consider that Sydney Water should have included a backward looking analysis between the current year and the prior year. This could then be extended on in future years.
	• Dry weather overflows – the report includes charts that compare the current year performance with the prior five years for both the number of dry weather overflows and the number of repeat overflows. The report includes on paragraph establishing the deep soil moisture has a strong correlation with blockages and overflows. There is then one paragraph discussing the five year trend against the current year. We note that:
	  • There is no data provided on the level of deep soil moisture (i.e. as there is for soil moisture at 0.1 – 1.0m depth earlier in the report for water continuity)
	  • The discussion of the relationship between soil moisture and performance, i.e. "During 2018/19 extremely dry soil condition resulted in an increase in properties affected" does not match the reported data as the 2018/19 year is relatively consistent with 2015/16 and 2016/17 and a small increase on the prior year. The trend is generally stable, not reflective of an extreme. There is then no information in the report to validate that increased soil moisture has driven the improved performance seen in 2019/20 and 2020/21.
	Based on the above observations that:
	1. The discussion of factors that influence performance is at a high level only
	2. There is no backward looking analysis of performance for the water pressure standard
	3. The discussion of drivers for observed historical performance for dry weather overflows is very limited, lacking supporting evidence and appears to misrepresent the data
	We conclude that Sydney Water has not yet adequately addressed the requirements of this recommendations and nor the requirements of the reporting manual for the performance standards report.
	We also note that the report still contains discussion of various initiatives that Sydney Water is undertaking to improve service interruptions performance. However, the discussion of these initiatives typically has little critical analysis regarding the potential or actual influence of these initiatives on performance and appear to distract from the intention of the performance standards report.

Recommendation status	This recommendation remains open and should be checked for completion at the next operational audit

Recommendation 2020-23: Reporting clause 10.2.4

Item	Detail
IPART's recommendation to the Minister	By 30 June 2021, Sydney Water must improve document control of the records held in its systems by ensuring that information such as the version date, version number, change history and document author are included in all records
Progress on 2020 audit findings as reported by utility on 31 May 2021	New recommendation in 2020. Status reported on 31 May 2021: On track The following actions are completed or underway: • Coaching & mentoring key control document contributors through business partnering. • Delivered several Controlled Document training sessions covering good document management practices and how to comply with the Controlled Document Standard. • Posted weekly updates on Yammer (internal social media site) promoting best practice document control and newly introduced features in SWIM (document system). • Created templates for the majority of controlled document types to ensure consistency and standardisation of metadata. • Nominated suitable document controllers in SWIM to ensure standards are consistent across document management platforms. • Established a reporting capability to improve monitoring of compliance with the controlled document standard across the enterprise and identify areas that require additional support. 30 June 2021.
IPART guidance	Auditor to check for completion
Audit finding	At the whole of enterprise, management system level, Sydney Water identified that it is realigning and simplifying its various management system into a "One Management System" (1MS) approach. This approached was endorsed by Sydney Water's executive in September 2020 and a detailed implementation plan was endorsed in March 2021. This high level move to consolidate management systems is relevant to this recommendation as it will likely result in a reduction and refresh of system records. Sydney Water detailed that as part of this 1MS initiative, it has established a dashboard for reporting on the currency of controlled documents and management system actions. At our audit in September 2021, this dashboard showed that from the "Level 3 business area' perspective, there is currently 372 expired controlled documents out of 2,451 total controlled documents, i.e. 15% of controlled documents. While we recognise that there will always be some expired controlled documents in a well-managed management system (or systems), we consider that 15% of all documents being expired is inadequate to demonstrate that Sydney Water has addressed this recommendation and we therefore consider that this recommendation is still open.
Recommendation status	This recommendation remains open and should be checked for completion at the next operational audit.

Appendix A Evidence sighted

Clause 1.7 – Pricing

- 2020 21 Prices_ Email approval KM_SC_CL_PD.pdf
- Waterwrap Aug - Oct 2020.pdf
- Waterwrap May - July 2020.pdf
- SWIM 2947101_Internal Pricing Audit 2020-21_signed HOB.pdf
- BMIS D0000695 v3_Update e-Developoer Ancillary Service Charges procedure.pdf
- BMIS D0000861_RAS Updating prices for products provided via Property Link procedure.pdf
- BMIS D0000864_RAS Updating prices for products provided via Sydney Water Tap in procedure.pdf
- SWIM 775467 v5_ Implementing IPART determined retail prices.pdf
- SWIM 786730 v3_SOP Annual IPART price changes.pdf
- Drought water usage charge awareness ppt_ Billing team_list of attendees.pdf
- HOB Approval_MW_ Implementing the drought water usage charge procedure_ Feb 2021.pdf
- SWIM 2905867_ Implementing the drought uplift water usage charge.pdf
- Sydney Water_Drought water usage charge_ Billing Team_26 May 2021.pptx
- 789257 Recycled water developer charges calculation and tracking.pdf
- D0000671.docx
- D0000672.docx
- D0000874.docx
- Recycled water developer charges_existing scheme v2.xlsx
- Recycled water developer charges_new scheme v2.xlsx
- 2020-21 Pricing audit_ follow up_ Commercial quality charge_Low BOD food.pdf
- 2020-21 Pricing audit_ follow up_ Dishonoured payment fee.pdf
- Premiers request under IPART Act S12A_Dishonoured fee and LPF.pdf

Clause 2.2 – Obligation to make services available

- Water Availability evidence_Hydra and Tap In.docx
- Water Connection Staff Guide.docx
- Watermain Connection Audit.docx
- WICA Licensees.docx

Clause 3.1 - Economic approach for water conservation

- 200825 Water Conservation PCB minutes.docx
- 200922 Water Conservation PCB minutes.docx
- 201103 Water Conservation PCB minutes.docx
- 201222 Water Conservation PCB Meeting Minutes.docx
- 210203 Water Conservation PCB minutes.docx
- 210223 Water Conservation PCB minutes.docx

- 210323 Water Conservation PCB minutes.docx
- 210427 Water Conservation PCB minutes.docx
- 210525 Water Conservation PCB minutes.docx
- 5. Water Conservation report 20-21 - FINAL.pdf
- 21-28A Water Conservation Reporting Final Report.pdf
- Leakage management plan 2021_AMQ0057.docx
- PCB ToR .docx
- SWIM Doc 581627 - ELWC Methodology.docx
- WC 2020_21 Program review Dec2020 Final 1.5.docx
- Leak Management Manual 2021_AMQ0028.pdf
- Table for report 8 December 2020 Selected Ideas submitted.pdf
- Water Conservation Innovation Fund project slides short listed 2020_21 projects and overview .pdf
- Water Conservation Innovation Fund project tracking for 2020_2021 Projects set up and governance .xlsx
- Water Conservation RI Priotisation Meeting 2 December 2020 8 December 2020 Minutes and Actions.pdf

Clause 3.2 - Water Planning

- Letter Chair SW transfer responsibilitis from WNSW.pdf
- MoU - Transfer of Supply Augmentation Planning Function - SWC Execution Version.pdf
- RWaaP Portfolio MP v4.1 (FINAL DRAFT).docx
- RWaaP RAID.xlsm
- Supply Augmentation Actions and Data Sharing Register.xlsx
- Sydney Water Position Statement - Recycled Water.pdf
- GSDRP Program_Revision 1.6.xlsx
- LTCOP_Program21-09-16.pdf
- MOU - Supply Planning Transfer - WaterNSW Counterpart - Executed - 29.01.21.pdf
- MoU - Transfer of Water Augmentation Planning - Roch Cheroux execution page.pdf

Clause 4.1 – Drinking water

- [Rev4] Sodium Silico Fluoride Specification Sheet.pdf
- 05_24 180521_SDP_extension_final (2).pdf
- 1008829 - Macarthur Delivery - System Process Flow Diagram.pdf
- 1008832 - North Richmond Delivery System - Process Flow Diagram.pdf
- 1267730 - Annual Drinking Water Quality Monitoring Plan 2020-21 Final.pdf
- 1267732 - Drinking Water Operational monitoring plan 2020-21 Final.pdf
- 1277504 Competency 1.05.pdf
- 1277513 Competency 1.07.pdf
- 1MS Implementation Plan_Final - DA.docx
- 20-1362-01++1%+Sodium+Hypochlorite+16+Nov+2020.pdf
- 2019 Desktop fluoride code compliance assessment.xlsx
- 2020 07 17 Prominent Service Report S26912 - AFL5048.pdf
- 2020 07 28 ThermoFisher Service Report SV2007170020 - AFL5044.pdf

- 2020 09 30 ThermoFisher Service Report SV2009100074 - AFL5044.pdf
- 20201015 Critical Instrument WIs training record sheet - KG.pdf
- 2020 Consolidated Action Plan - Risk Review_Collated Southern.xlsx
- 2020-21 Drinking Water Product Improvement Plan-August 2021.xlsx
- 2020-21 North Richmond and Macarthur Fluoride Compliance Grab and 8am results.xlsx
- 2021 02 18 Prominent Service Report S27460 - AFL5048.pdf
- 2021 02 18 Prominent Service Report S27462 - AFL5044.pdf
- 20210623 WRR and WS&P COVID19 Controls.pdf
- 20210625 Significant Incident Situation Report 1 Potts Hill Reservoir Roof Faults.docx
- 20210626 WRR and WS&P COVID19 Controls.pdf
- 20210702 Significant Incident Situation Report 2 Potts Hill Reservoir Roof Faults.docx
- 20210730 Significant Incident Sit Rep 3 Potts Hill Reservoir Roof Faults.pdf
- 202108 Potts Hill Res Risk Assessment DRAFT.pdf
- 20210830 Potts Hill Reservoir Risk Assessment Minutes Aug-21.docx
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- Q2 2021 JOG - Item 3.2 Water Quality Update.pdf
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- Q2 2021 JOG - Item 7.4 Recycled Water update May 2021 JOG.pdf
- Q2 2021 JOG Minutes-120521.DOCX
- Q2 Recycled Water Report for NSW Health.pdf
- Q3 2021 JOG Item 3.3 Water Product Update.pdf
- Q3 Recycled Water Report for NSW Health.pdf
- Q4 Recycled Water Report for NSW Health.pdf
- Recycled Water Plant Selection - Risk Based Criteria.xlsx
- Recycled water scheme audit schedule 21-23.xlsx
- Report-Liverpool WRP High Results for RW on 30th Sept and 7th October 2020.docx
- Review of RWQMPs - Schedule and Progress.xlsx
- Risk Assessment Report_Colebee and Quakers Hill RW scheme.pdf
- RW EKAMS Results FY20-21.pdf
- RW sites-audits and actions 2020-21.xlsx
- RWQMS 2020 review – BMIS Screenshots.docx
- SAP - Consent to discharge industrial trade wastewater 23608 - relationship management meeting 240521.pdf
- SAP - Consent to discharge industrial trade wastewater 23608 - routine inspection 180321.pdf
- SAP - Permit to discharge commercial trade waste agreement 51304.pdf
- ST0009_Liverpool Maximo Work Orders for requested instruments.xlsx
- SWEMS0003.01-Environmental External Requirements Register.docx
- SWIM - Consent to discharge industrial trade wastewater 23608 - audit sample 170521.PDF
- SWIM - Consent to discharge industrial trade wastewater 23608 customer sample 170621.pdf
- SWIM - Consent to discharge industrial trade wastewater 23608 signed 270521.pdf
- SWIM - Liverpool Golf Club Recycled Water Customer Meeting Minutes 261120.pdf
- SWIM-Annual declaration - Australian Turf Club 230721.pdf
- SWIM-Annual declaration - Liverpool Golf Club 030821.pdf
- SWIM-Australian Turf Club Recycled Water Customer Meeting Minutes 26112020.pdf
- SWIM-Liverpool Golf Club Recycled Water Customer Meeting Minutes 090721.pdf
- SWIM-Liverpool Golf Club Recycled Water Supply Agreement for Irrigation Use 2012.pdf

- SWIM-Recycled Water Supply Agreement for Irrigation Use Australian Turf Club 2012.pdf
- SWIM-Recycled Water Supply Agrement (sic) for Irrigation Use Australian Turf Club - Letter of Variation June 2019.pdf
- Technical Specifications Sodium Hypochlorite.PNG
- Training Record – Staff name redacted.pdf
- Waste ID - Screenshot of waste tracking for permit to discharge commercial trade waste agreement 51304.docx
- WQ0003 - Liverpool RWQMP.docx
- WQ0003_Liverpool Recycled Water Quality Management Plan.docx
- WR5271 - Recycled Water Quality Event Management Plan.docx
- WR5271-In house Training Records.pdf
- WRHQ5050 - Notification of Plant Recycled Water Production Interruptions.docx
- 618953 - Management Review procedure (Updated).pdf
- 619010 - Assurance (2LOA) procedure (Updated).pdf
- Archive screenshot-IMS Assurance procedure.jpg
- Archive Screenshot-IMS Mgt Review procedure.jpg
- SDIMS0010-IMS Assurance procedure (Archived on 040221).docx
- SDIMS0012-IMS Mgt Review procedure (archived on 040221).docx

Clause 4.3 – Fluoridation

- [Rev4] Sodium Silico Fluoride Specification Sheet.pdf
- 2020 07 17 Prominent Service Report S26912 - AFL5048.pdf
- 2020 07 17 Prominent Service Report S26912 - AFL5048.pdf
- 2020 07 17 Prominent Service Report S26912 - AFL5048.pdf
- 2020 07 28 ThermoFisher Service Report SV2007170020 - AFL5044.pdf
- 2020 07 28 ThermoFisher Service Report SV2007170020 - AFL5044.pdf
- 2020 07 28 ThermoFisher Service Report SV2007170020 - AFL5044.pdf
- 2020 09 30 ThermoFisher Service Report SV2009100074 - AFL5044.pdf
- 2020 09 30 ThermoFisher Service Report SV2009100074 - AFL5044.pdf
- 2020 09 30 ThermoFisher Service Report SV2009100074 - AFL5044.pdf
- 20201015 Critical Instrument WIs training record sheet - KG.pdf
- 20201015 Critical Instrument WIs training record sheet - KG.pdf
- 20201015 Critical Instrument WIs training record sheet - KG.pdf
- 2021 02 18 Prominent Service Report S27460 - AFL5048.pdf
- 2021 02 18 Prominent Service Report S27460 - AFL5048.pdf
- 2021 02 18 Prominent Service Report S27460 - AFL5048.pdf
- 2021 02 18 Prominent Service Report S27462 - AFL5044.pdf
- 2021 02 18 Prominent Service Report S27462 - AFL5044.pdf
- 2021 02 18 Prominent Service Report S27462 - AFL5044.pdf
- Additional Fluoride documentation.msg
- Additional information requested - North Richmond WFP - Fluoridation Code.msg
- Colin Arkell NSW Health authority Fluoride plant operator 2019.pdf
- Colin Arkell_Fluoride_2019.pdf
- David Blackburne fluoride tafe 2007.pdf
- Fiona Bullivant Fluoride NSW Health 1997.pdf

- Fluoride Action List progress update July 2021.xlsx
- Fluoride Recycling Effect Diagram.pdf
- Fluoride Recycling Effect Diagram.pdf
- Fluoride Upgrade FMEA 240821.xlsx
- Fluoride Upgrade FMECA 031121 (working).xlsx
- Fluoride Upgrade FMECA 031121 (working).xlsx
- Macarthur Calibration Schedule Rev 2021.05.12.xlsx
- Macarthur Extract of calibration forms relevant to fluoride.xlsx
- Macarthur Fluoridation Plant Design Risk Assessment Meeting Agenda 10082021 Rev1.docx
- Macarthur Fluoridation Plant Design Risk Assessment Meeting Agenda 10082021.docx
- Macarthur Fluoridation Plant Design Risk Assessment Meeting Agenda 100821.pdf
- Macarthur Fluoridation System Audit E-0007-G-REP-001_DR_170905.pdf
- Macarthur Fluoride external audit 2019-2020 action plan_24 AUGUST 2021.xlsx
- Macarthur Fluoride High High Shutdown Alarm SCADA.png
- Macarthur Fluoride High High Shutdown Alarm SCADA.png
- Macarthur Fluoride Operational Risk Assessment.xlsx
- Macarthur Fluoride Spill_Dilution_calculations.xlsx
- Macarthur Fluoride Spill_Dilution_calculations.xlsx
- Macarthur Fluoride System Upgrade Design Specification Process 100821.pptx
- Macarthur Max Return Rate Supernatant setpoint limit.png
- Macarthur Max Return Rate Supernatant setpoint limit.png
- Macarthur Max Return Rate Supernatant.png
- Macarthur Max Return Rate Supernatant.png
- Macarthur Monthly Fluoride report example June 2021.xlsx
- Macarthur P&ID schematics - TW-P-0101 (002).pdf
- Macarthur P&ID schematics - TW-P-0101 (002).pdf
- Macarthur revised Fluoride Recycling Effect Diagram.pdf
- Macarthur revised Fluoride Recycling Effect Diagram.pdf
- Macarthur SP5 TW Fluoride 1 July 2020 - 30 June 2021.xlsx
- Macarthur staff fluoride certificates.zip
- Macarthur washwater tank level SCADA trend.png
- Macarthur washwater tank level SCADA trend.png
- Macarthur WFP Fluoride Audit Report Final 2020.docx
- Macarthur WQ Risk Assessment Table 5 June 2021.xlsx
- MAC-EAP-010 Emergency Action Plan Chemical Spill or leak Fluoride.docx
- MAC-EAP-014 Fluoride overdosing event.docx
- MAC-PLN-005 Macarthur WFP Drinking Water Quality Management Plan.docx
- MAC-WI-A001-F1 Water_Q rev 20 12JULY2021.xlsx
- MAC-WI-L004 Fluoride Measurement.docx
- MAC-WI-L005 Fluoride Analyser calibration check and maintenance.docx
- MAC-WI-L045 rev 1 Calibration of On-Line Prominent Fluoride Analyser_reviewed for currency 13Sep2019.docx
- MAC-WI-P001 Ordering Chemicals.docx

- MAC-WI-P002 Fluoride Mass Balance & Health Department Report_reviewed for currency 8Jul2021.pdf
- MAC-WI-P002-F1 Fluoride fill form.xlsx
- MAC-WI-P006 Loading of Powdered Sodium SilicoFluoride.docx
- MAC-WI-P022-F1 Fluoride Screw Feeder Drop Test Trending.xlsm
- Matt Benstead Fluoride NSW Health 2010.pdf
- Matt Benstead Tafe Fluoride 2010.pdf
- Mike Lansley nsw health fluoride 1997.pdf
- Monthly Fluoride Report to NSW Health June 2021.xlsx
- MWFP Fluoridation System FMECA.docx
- MWFP Fluoride System Upgrade (Rev3)_current project.pdf
- Nathan Williams Fluoride authorisation Dept Health 2018.pdf
- North Richmond WFP - Fluoride drop test log sheet.jpg
- North Richmond WFP Fluoride Operator Certificate - Derek Wiggins.pdf
- North Richmond WFP Fluoride Operator Certificate - Jeffrey Meijnderts.pdf
- North Richmond WFP Fluoride Operator Certificate - John Van Der Meulen.pdf
- North Richmond WFP list of procedures.JPG
- Pat Nolan NSW Health Fluoride 1995.pdf
- Paul Lovasz fluoride tafe 2016.pdf
- Paul Lovasz NSW Health Fluoride Plant Operator undated but 2016.pdf
- SWIRL INC-31476 Example Form 5 Orchard Hills 20 July 2020.pdf
- Training records - CCP instruments SOPs - North Richmond WFP.pdf
- Unified monthlyreport June 2021LO V2.xlsm
- WPIMS5228_DWQ Event Management Plan.docx
- WT0011 Fluoride system maintenance PM CM and BM audit period.xlsx
- WT5127 Laboratory Determination of Fluoride.docx
- WT5232 Quality Assurane of Bulk Chemicals.docx
- WTNR5004 - North Richmond WFP Daily Workflow Process and Equipment Monitoring.docx
- WTNR5019.01 WI for maintenance of ProMinent DACa Online Fluoride Analyser.docx
- WTNR5019.01 WI for maintenance of ProMinent DACa Online Fluoride Analyser.docx

Clause 5.1 – Water Continuity Standard

- D0001274 - Maintenance Field Crew Click Mobile Work Instruction (Pg15-22).pdf
- iConnect - CD Scorecard February 2021.pdf
- iConnect - Network Performance Report June 2021.pdf
- Maximo BI - All Unplanned Water Interruption 25082021.xlsx
- Maximo BI - Water Continuity Standard Data Quality 25082021.xlsx
- Maximo BI - Weekly Data Quality Report 15022021.xlsx
- SWIM1278037 - PS 1 - Water Continuity Standard - OL 5.1.1.docx
- SWIM2947670 - Climate Impacts Guide Final.pdf
- SWIM2947671 - WO79279385 Hermitage Remainder Incident Investigation.docx
- SWIM2947672 - Water Continuity Investigation Report for 201920 (draft).docx

- SWIM2948227 - Water Continuity Root Cause Workshop Attendance.pdf

Clause 5.3 – Dry Weather Wastewater Overflow Standard

- iConnect - Wastewater – Monthly Report June 2021.pdf
- Maximo BI - All Uncontrolled Wastewater Overflows Jobs 25082021.xlsx
- Maximo BI - Weekly Data Quality Report 15022021.xlsx
- SWIM1278039 - PS 3 - Wastewater Overflow Standard - OL 5.3.1.docx

Clause 5.5 – Asset Management

- 1MS Implementation Plan_Final - DA.docx
- 2020 Consolidated Action Plan - Risk Review_Collated Southern.xlsx
- 2021.02_PALG_Minutes Asset Performance Report_performance metrics.docx
- 2914544_State of Asset Report.pdf
- AISSecurityInspection 08-12-20.pdf
- AMS Communication Activities 2020-21.xlsx
- AMS Training & Awareness Activities 2020-21.xlsx
- Asset Management Improvement Plan20Sept2021 .xlsx
- Asset Mgt in SWC - Dec 20 - Summary Board presentation Thursday 17th.pptx
- Asset Performance_Month Report ALG (June Data).xlsx
- Current cover access technique Potts Hill.docx
- D0000675 - PAMF ToR.pdf
- D0000676 - PALG ToR.pdf
- D0000876 SAMP.pdf
- D0000876.01 Asset Mgmt Objectives & Measures.pdf
- D0000876.02 Asset Mgmt Value Chain.pdf
- Dam Safety Exercise May 2016.png
- IConnect_Regulatory Relationships page extract.png
- Interview list 19August20.xlsx
- List of audits and actions 2020-21-21.xlsx
- Northmead Follow Up Actions, progress report Aug 2021.pdf
- Northmead Lessons Learned Final.pdf
- PD - Principal Engineer Civil Structures.docx
- PD-Service Planning Analyst 2016.pdf
- Policy and guidelines for community and stakeholder engagement.pdf
- Potts Hill Inspections Monitior WO's.xlsx
- Potts Hill Reservoir - Initial meeting with ISP 14 Jan 2020.docx
- Potts Hill Reservoir _Incident Mgt Plan Utilisation.docx
- Potts Hill Reservoir Controls 011121.pdf
- Potts Hill timeline (RA) v3.pptx
- Risk Review 2021 final - Southern updated 081121.xlsx
- Stakeholder engagement update July to August 2021.pdf
- TimePhoto_20201208_073711_resized_1.jpg
- TimePhoto_20201208_073716_resized_1 (1).jpg
- TimePhoto_20201208_073733_resized (1).jpg
- TimePhoto_20201208_075810_resized_1 (1).jpg

- TimePhoto_20201208_075817_resized_1 (1).jpg
- WNS0035 Potts Hill Res Dam Safety Emergency Plan.pdf
- Working together better by improving our Asset Management and Services email 1March21.msg
- WWTP Asset Performance Report 2021 01 v2 PALG Feb presentation.pdf

Clause 7.2 – Memorandum of understanding with FRNSW

- E_Flow and pressure data for Sydney Water Hydrants 020320.msg
- E_Reduced Available Pressure and Flow.msg
- Fireflow maps example data for FRNSW Bantry Bay Zone.xlsx
- FRNSW MOU Activity RACI Aug 21.xlsx
- 0028 - SW Working Group Meeting Minutes - 1-12-2020 ejb040221.docx
- 999835 - 34-36 The Crescent Dee Why NSW 2099.pdf
- 1260446 SWC TapIn Staff Connections Guide.docx
- DM-AP-00004245 Supply of Water for Fire Fighting Purposes - Policy Manual.doc
- E_External FRNSWSydney Water Hydrant App - Report Discussion.msg
- SW FRNSW Working Group Meeting Minutes - 040821 Draft.docx"
- DRAFT RP - The Supply Of Water For Fire Fighting Purposes (2020 template).docx
- Firefighting SLG meeting 4 Minutes 250919 - Final.docx
- FW RE External Draft meeting minutes SW Working Group.msg
- FW SW FRNSW Working Group Meeting Minutes - 040821 Draft.msg
- Review of Fire Fighting Policy ejb200120.pdf
- SWCFRNSW work program summary July2016.pdf
- ACS_Drinking Water_Service Levels_Draft 220921.xlsx
- Critical Watermain Renewals_DecfInterium Additions_041220.pdf
- E_Report for FRNSW_project brief_27 Aug2021.pdf
- Firefighting related expenditure to SWC 2015_2021_High Level estimate.xlsx
- FRNSW Commissioner Letter 13July2016.pdf
- FRNSW MOU Kickoff presentation 2 July 2015 cc2.pptx
- FRNSW_Request for information reference sheet.docx
- Project Plan Draft for review - Fire Hydrants Hydraulic Assessment .docx
- Retic Watermains Renewals_DF Interium Additions_041220.pdf

Clause 10.2 – Reporting

- Email - 2nd Quarterly Drinking Water Quality Monitoring Report to NSW Health 2020-21.msg
- "Email - April 2021 Fluoride Report for NSW Health.msg
- "Email - Screen shots of reports for Op licence Audit.msg
- "Final - Approval timeline for 1 Sept OL Reports 2020-21.docx
- "iConnect-Managing Controlled Documents.png
- "IIAP presentation May 2021.pptx
- "Manual with TOC Template.docx
- "Performance Indicator Sheet template_final 100518.docx

- "Policy Template.docx
- "Procedure Template.docx
- "Procedure with TOC Template.docx"
- "Q2 2021 JOG - Item 3.2 Water Quality Update.pdf
- "Q2 2021 JOG Minutes 12th May 2021 - Final.DOCX
- "Q3 2020 JOG Minutes 17 August 2020 final.DOCX
- "Specification Template.docx
- "Standard Template.docx
- "SWIM 2903217 Quarter 2 2020-21 Quarterly report to NSW Health Final.pdf
- "SWIM 2929304 - April 2021 SW Monthly Fluoride Report to NSW Health.xlsx
- "SWIRL - INC-35724 - E.coli detect at 13 Clearfield St Colebee.pdf
- "SWIRL INC-34566 E.colipositive at Potts Hill SWIRL entry..pdf
- "Waterways Newsletter Article Managing Controlled Documents.png
- "Work Instruction Template.docx
- "608701-Controlled Documents Standard.docx
- "618990 Action Request procedure.pdf
- "619010 2LOA Audit procedure.pdf
- "619012 1LOA Monitoring and measurement procedure.pdf
- "801201 Quality Management System ISO9001 certificate.pdf
- "822057 NATA Certificate.pdf
- "1310306 2019-20 - Minutes - Annual Management Review.pdf
- "BMIS D0000058 Operating Licence Annual Reporting Procedure.pdf
- "BMIS Working Group Agenda 12 April 2021.pdf
- "Business Continuity Plan Template.docx
- "Content Management Controlled Documents Training Slides.pptx
- "Content Management Plan .pptx
- "Controlled Document Standard Promotional Yammer Posts.docx
- 2943179 Q4 2020-21 Drinking Water Report to NSW Health.pdf
- Annual DWQ and Performance Report 202021_FINAL.pdf
- Annual RWQ and Performance Report 202021_FINAL.pdf
- RE_ screen shots as requested as well as the controlled documents standard v2.msg
- 608701 Controlled Document Standard.pdf
- CD Documents.pdf
- Here are the screen shots as requested as well as the controlled documents standard.msg
- IPART Audit Interview Evidence MS Dashboard CD Expired Controlled Documents Report 17 Sep 2021.pdf
- IPART Audit Interview Evidence MS Dashboard CD Expired Documents 17 Sep 2021.xlsx
- MS Dashboard Controlled Documents.jpg
- RE_ Here are the screen shots as requested as well as the controlled documents standard.msg
- Sydney Water Consolidated SWEMS0015.27 - Resource use and recovery (waste) report 20_21.xlsx
- E3 E4 and IPART A1, A2, A10, A11, A12
- Environment Indicators Performance Report 20-21 - Final 300921.pdf

- Environment Indicators Performance Report 20-21 - Final draft.docx
- FW FW External RE NGER Report Q4 April - June 2021.msg
- RE Native veg query.msg
- RE_ OL Audit - Record of Interview - Reporting.msg
- Response to additional Questions .docx
- SWC letter to IPART - provision of Environment Indicators Performance Report 2020-21.pd
- SWEMS0015.27.xlsx
- Sydney Water Consolidated Resource use and recovery (waste) report 21-22.xlsx
- Sydney Water Consolidated Resource use and recovery (waste) report 21-22_xlsx.msg

E IPART's checks for the 2021 operational audit

Table E.1 Clauses that we checked as part of the 2021 operational audit

Licence clause	Operating Licence obligation	Compliance grade	Findings	Recommendations/ Opportunities for improvement
1.6	**Availability of licence**			
1.6.1	Sydney Water must make a copy of this Licence available to any person, free of charge: on its website; and upon request made to the Contact Centre.		We accessed the Sydney Water Licence and downloaded it from its website on 15 November 2021. We also called the contact centre to verify that the Licence can be supplied free of charge to any customer.	NA
3.1	**Economic approach for water conservation**			
3.1.3	Sydney Water must make: a copy of the Current Economic Method; a plain English summary of the Current Economic Method; and the economic level of water conservation (expressed as the value of water in dollars per kilolitre and as the quantity of savings in megalitres per day) determined in accordance with the Current Economic Method, available: to any person, free of charge upon request made to the Contact Centre; and on Sydney Water's website.		We accessed the listed documents on the Sydney Water website on 15 November 2021. We also called the contact centre to verify that the Licence can be supplied free of charge to any customer.	NA
6.1	**Customer contract**			
6.1.2	Sydney Water must make a copy of the Customer Contract available to any person, free of charge: on its website; and upon request made to the Contact Centre.		We accessed the listed documents on the Sydney Water website on 15 November 2021. We also called the contact centre to verify that the Customer Contract can be supplied free of charge to any customer.	NA

Licence clause	Operating Licence obligation	Compliance grade	Findings	Recommendations/ Opportunities for improvement
6.7	**Internal complaints handling**			
6.7.4	Sydney Water must make the information concerning internal Complaints handling referred to in clause 6.7.3 available to any person, free of charge: on its website; and upon request made to the Contact Centre.		The Sydney Water Complaints Policy is available on the website and more information provided in customer contract mailed out with current bills. Checked website on 15 November 2021. Checked current bill mailed out on 25 October 2021. The contact details on the website provide scope to make complaints either directly (call centre number provided) or by email. We did not pursue this any further and are satisfied the licensee has met its obligations.	NA
6.8	**External dispute resolution scheme**			
6.8.1	Sydney Water must be a member of the Energy & Water Ombudsman NSW to facilitate the resolution of disputes between Sydney Water and its Customers and Consumers.		Both the pamphlet mailed out to customers and the website provide advice on contacting EWON if required for resolution of disputes. The EWON website also notes Sydney Water is required by its operating licence to be a member. Both websites were checked on 15 November 2021.	NA
7.2	**Memorandum of Understanding with FRNSW**			
7.2.1	Sydney Water must use its best endeavours to maintain a memorandum of understanding with Fire and Rescue NSW (FRNSW).		Checked submission from FRNSW. MoU is in place. FRNSW noted the frequency of meetings had dropped (due to Covid-19) which has impacted on the effectiveness of the relationship between the two parties.	NA
7.2.4	The memorandum of understanding with FRNSW must require the maintenance of a working group and must provide that: the working group must include representatives from Sydney Water and FRNSW and may include representatives from other organisations such as the NSW Rural Fire Service; and the working group is to consider the following matters (at a minimum): information sharing arrangements between Sydney Water and FRNSW; agreed timelines and a format for Sydney Water to provide a report to FRNSW detailing the network performance with regard to availability of water for firefighting (taking into account the minimum available flow and pressure in localised areas of the network);		Checked submission from FRNSW and audit report. Submission notes that a working group exists, that shares information relevant to improving outcomes. FRNSW notes that a comprehensive understanding of the performance of the Sydney Water network is critical to making informed strategic and financial decisions for the benefit of the community. FRNSW considers that SW has not yet provided the required data, citing resourcing constraints. FRNSW states that " it is highly unlikely that any progress will be made [in regards to development of policy and the efficient and effective provision of firefighting water] until appropriate resources are committed to the licence obligation." As part of its assessment of clause 7.2.2, the auditor addressed the issue of resourcing and fulfilling the terms of the MoU. The auditor notes Sydney Water is using best endeavours, that it has been constrained by competing priorities, especially Covid-19. Sydney Water provided an estimate of its expenditure made in support of the activities since 2015. The largest components of expenditure are for repairs to hydrants and modelling.	

Licence clause	Operating Licence obligation	Compliance grade	Findings	Recommendations/ Opportunities for improvement
	arrangements for Sydney Water to consult with FRNSW in the design of new assets and planning of system maintenance, where planning indicates that minimum available flow and pressure may unduly impact firefighting in the network section under consideration; and other matters as agreed by both Sydney Water and FRNSW		Based on the information provided, particularly the ongoing activities which have become business as usual such as sharing information, rectifying defects and investigating poor water pressure, the auditor concluded that Sydney Water has complied with this clause. We agree with this assessment, noting that the auditor provided OFIs (refer pg 133 of audit report)	
8.2	**Publication of servicing information**			
8.2.2	Sydney Water must, by 30 September 2020 (or another date approved by IPART in writing), publish electronically the Servicing Information for each major water system and wastewater system that it has available by that date that is in a form suitable for publication.		Sydney Water references the Servicing Information on its website under *Growth Servicing Plan* (accessed here). The webpage contains an email address and invites interested parties to email Sydney Water if they require access to the information. This can arguably be described as consistent with the requirements of the licence condition; however, it would be better if a link was provided directly to the data.	
8.2.3	Sydney Water must continue to publish Servicing Information for each major water system and wastewater system as it becomes available. Sydney Water must publish all Servicing Information by 30 June 2021 (or another date approved by IPART in writing).		As above	
10.1	**Operational audits**			
10.1.1	Sydney Water must cooperate with an audit undertaken by IPART or an Auditor of Sydney Water's compliance with any of the following: this Licence (including the Customer Contract); the Reporting Manual; and any matters specified by the Minister, (the Operational Audit).		The Sydney Water operational audit was undertaken in September 2020 under the supervision of IPART staff. All required information was provided by Sydney Water as requested. The auditor did not raise any issues related to this clause during the 2020 audit or in response to our annual questionnaire.	NA
10.1.2	For the purpose of any Operational Audit or verifying a report on an Operational Audit, Sydney Water must, within a reasonable period of receiving a request from IPART or an Auditor, provide IPART or the Auditor with all the information in Sydney Water's possession, custody or control that is necessary to conduct the Operational Audit, including any information that is reasonably requested by IPART or an Auditor.		The Sydney Water operational audit was undertaken in September 2020 under the supervision of IPART staff. All required information was provided by Sydney Water as requested. The auditor did not raise any issues related to this clause during the 2020 audit or in response to our annual questionnaire.	NA

Licence clause	Operating Licence obligation	Compliance grade	Findings	Recommendations/ Opportunities for improvement
10.1.3	For the purpose of any Operational Audit or verifying a report on an Operational Audit, Sydney Water must permit IPART or the Auditor to: access any works, premises or offices occupied by Sydney Water; carry out inspections, measurements and tests on, or in relation to, any such works, premises or offices; take on to any such premises or offices any person or equipment necessary for the purpose of performing the Operational Audit or verifying any report on the Operational Audit; inspect and make copies of, and take extracts from, any books and records of Sydney Water that are maintained in relation to the performance of Sydney Water's obligations under this Licence (including the Reporting Manual); and discuss matters relevant to the Operational Audit or any report on the Operational Audit with Sydney Water, including Sydney Water's officers and employees.		The Sydney Water operational audit was undertaken in September 2020 under the supervision of IPART staff. All required information was provided by Sydney Water as requested. The auditor did not raise any issues related to this clause during the 2020 audit or in response to our annual questionnaire.	NA
10.3	**Provision of information for performance monitoring**			
10.3.1	Sydney Water must provide IPART information relating to the performance of any of Sydney Water's obligations under clause 10.2 (including providing IPART physical and electronic access to the records required to be kept under clause 10.2) within a reasonable time of Sydney Water's receiving a request from IPART for that information.		The Sydney Water operational audit was undertaken in September 2020 under the supervision of IPART staff. All required information was provided by Sydney Water as requested. The auditor did not raise any issues related to this clause during the 2020 audit or in response to our annual questionnaire.	NA
10.3.2	Sydney Water must provide IPART such information as is reasonably required to enable IPART to conduct any review or investigation of Sydney Water's obligations under this Licence within a reasonable time of Sydney Water receiving a request from IPART for that information.		The Sydney Water operational audit was undertaken in September 2020 under the supervision of IPART staff. All required information was provided by Sydney Water as requested. The auditor did not raise any issues related to this clause during the 2020 audit or in response to our annual questionnaire.	NA

Licence clause	Operating Licence obligation	Compliance grade	Findings	Recommendations/ Opportunities for improvement
10.3.3	If Sydney Water engages any person (including a subsidiary) to undertake any activities on its behalf, it must take all reasonable steps to ensure that, if required by IPART or an Auditor, any such persons provide information and do the things specified in clause 10.1 as if that person were Sydney Water.		The Sydney Water operational audit was undertaken in September 2020 under the supervision of IPART staff. All required information was provided by Sydney Water as requested. The auditor did not raise any issues related to this clause during the 2020 audit or in response to our annual questionnaire.	NA
10.3.4	If IPART or an Auditor requests information that is confidential, the information must be provided to IPART or the Auditor, subject to IPART or the Auditor entering into reasonable arrangements to ensure that the information remains confidential.		The Sydney Water operational audit was undertaken in September 2020 under the supervision of IPART staff. All required information was provided by Sydney Water as requested. The auditor did not raise any issues related to this clause during the 2020 audit or in response to our annual questionnaire.	NA
10.3.5	Sydney Water must provide NSW Health with information relating to water quality in the manner and form specified by NSW Health within a reasonable time of receiving NSW Health's request. [Note: Under section 19 of the Public Health Act 2010 (NSW), the Secretary of NSW Health may require Sydney Water to produce certain information.]		NSW Health's submission did not note any instances of information being withheld in regards to water quality.	NA

Note: = Compliant; = Compliant (minor shortcomings); = Non-Compliant (non-material); = Non-Compliant (material).

F Sydney Water's statement of compliance

Statement of Compliance 2021

For 2020/21

Submitted by Sydney Water

To: The Chief Executive Officer
Independent Pricing and Regulatory Tribunal of NSW
PO **Box K35**
Haymarket Post Shop NSW 1240

Sydney Water Corporation reports as follows:

1. This statement documents compliance during 2020-21 with all obligations to which Sydney Water Corporation is subject by virtue of its Operating Licence.

2. This report has been prepared by Sydney Water Corporation with all due care and skill, including to ensure that all information provided is true and correct, in full knowledge of conditions to which Sydney Water Corporation is subject under the *Sydney Water Act 1994*.

3. Schedule A provides information on all obligations with which Sydney Water Corporation did not comply during 2020-21.

4. Other than the information provided in Schedule A, Sydney Water Corporation has complied with all conditions to which it is subject.

5. The compliance reports have been approved by the Managing Director and the Chairman of the Board of Directors of Sydney Water Corporation.

DATE:	30/08/2021	DATE:	30/08/2021
Signed:		Signed:	
Name:	Roch Cheroux	Name:	Bruce Morgan
Designation:	Managing Director	Designation:	Chairman

Statement of Compliance 2020-21

Schedule A - Non Compliances 2020-21

Nil return for 2020-21
i. Date or period of non-compliance Not applicable
ii. Nature and extent of non-compliance (including whether and how many customers have been affected) Not applicable
iii. Results of any monitoring (where applicable) Not applicable
iv. Reasons for non-compliance Not applicable
v. Remedial action taken Not applicable
vi. Actual/anticipated date of achieving compliance Not applicable

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[i] The Hon. Melinda Pavey MP.
[ii] *Sydney Water Reporting Manual Operating Licence 2019-2023, November 2019.*
[iii] Sydney Water operational audit 2020 – Report to the Minister, March 2021.
[4] IPART, *Compliance and Enforcement Policy*, December 2017.
[5] IPART, *Audit Guideline – Public Water Utilities*, July 2019.
[6] The audit interviews were held online.
[7] IPART, *Audit Guideline – Public Water Utilities*, July 2019.