COMPLIANCE AND PERFORMANCE REPORT

SEPTEMBER 2020





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EXECUTIVE SUMMARY

Hunter Water is dedicated to providing safe, reliable and efficient water and wastewater services to the households and businesses of the Lower Hunter. Our Operating Licence¹ sets out the terms and quality expectations that govern the delivery of those services to the community. This report details our compliance with and performance against the requirements of our Operating Licence and Operating Licence Reporting Manual² for 2019-20.

Quality, safety and reliability are of critical importance to us. As a state owned corporation we strive to deliver these outcomes efficiently and with due regard to community and environmental values.

Hunter Water performed at a consistent, high standard throughout 2019-20. We are undertaking programs in 2020-21 to ensure that we continue to deliver high quality services to the Lower Hunter. Key performance and operational outcomes during 2019-20 include:

Supply services and performance standards

- Full conformance with the Drinking Water Quality Management System (DWQMS).
- Full conformance with the Recycled Water Quality Management System (RWQMS).
- Full compliance with regulatory requirements as specified in the Australian Drinking Water Guidelines (ADWG).
- Completed 90% of actions prioritised in the Drinking Water Quality Improvement Plan (DWQIP).
- Continued to consult with NSW Health on the implementation of previously proposed and agreed changes to water quality parameters at Critical Control Points (CCPs).
- Met system performance standards for water pressure, water continuity and wastewater overflows.

Water conservation & system yield

- Continued to make significant progress in the area of water conservation, which as of this year will be outlined in a separate water conservation report.
- Continued to monitor and review the level of service standards and system yield associated with Hunter Water and our storages.

Organisational systems management

- Successfully completed an ISO 55001:2014 re-certification audit of our certified Asset Management System.
- No major non-conformances with the Asset Management System (AMS) were identified during third party audits or internal audits.
- No major non-conformances with the Environmental Management System (EMS) were identified during third party audits or internal audits and certification maintained to ISO 14001:2016.
- No major non-conformances with the Quality Management System (QMS) were identified during third party audits or internal audits and certification maintained to ISO 9001:2015.
- Continued to adopt an integrated approach to managing the management systems in the form of an Integrated Management System (IMS). The IMS provides processes, principles and guidelines across the common functions of the AMS, EMS, QMS, Health and Safety Management System (HSMS) and

¹ NSW Government 2017, Hunter Water Operating Licence 2017-2022.

² NSW Government 2017, Hunter Water Operating Licence Reporting Manual 2017-2022.



Information Security Management System (ISMS). No major non-conformances with the IMS were identified during third party audits.

- Reviewed Enterprise Risk Management (ERM) framework and updated risk appetite statements.
- Continued planning and design for an integrated civil maintenance and field services management tool.
- Continued catchment improvement and environmental monitoring activities.
- Continued works on the Lake Macquarie effects based assessment of wastewater discharges.
- Commenced the development of a business case for centralised biosolids treatment with energy recovery and also began investigating onsite roof and ground mounted solar projects as an effective approach to delivering energy cost and carbon emissions savings.

Customer and stakeholder relations

- Regular consultation with our customers through the Customer and Community Advisory Group (CCAG). Consultation was held in accordance with the CCAG Charter and thus matters were raised either for information or to receive feedback from members.
- Actions implemented to improve the effectiveness and timeliness of customer complaint responses.
- Maintained a significant presence at community events to increase awareness and support for our most vulnerable customers. Hunter Water also revised its collection strategies and business rules from mid-March to June 2020 in direct response to COVID-19, to support those customers financially impacted.
- Ongoing membership of the External Dispute Resolution Scheme, through the Energy and Water Ombudsman of NSW (EWON).
- Compliance with the Customer Complaint Management Standard and Guideline, AS/NZS 10002:2014.



1 INTRODUCTION

Hunter Water is a state-owned corporation that provides safe, reliable and efficient water and wastewater services to over half a million people in the Lower Hunter region. We also manage trunk stormwater channels in the Newcastle, Lake Macquarie and Cessnock local government areas. We are governed by the *State Owned Corporations Act 1989 and Hunter Water Act 1991*. The NSW government regulates Hunter Water's operations through a number of regulatory bodies and instruments.

Our Operating Licence is the key regulatory instrument that enables and requires us to provide services. The Operating Licence contains terms and conditions which specify how services are to be provided, and quality and performance standards that must be achieved. Through it, we are accountable to the NSW government in terms of our performance. Our adherence to and performance against the Licence is monitored and reviewed by the Independent Pricing and Regulatory Tribunal (IPART).

This Compliance and Performance Report provides detailed information on our performance during 2019-20 with respect to prescribed clauses of the Operating Licence³ and in accordance with the associated Reporting Manual.⁴

The contents of this report are as follows:

- Chapter 2 The water quality performance of our drinking water and recycled water systems. We also report our performance against the minimum standards in our Operating Licence for water pressure, water continuity and wastewater overflows system performance.
- Chapter 3 Our methodology for calculating system yield. In previous years, this chapter would have also detailed our water conservation objectives, strategies and activities. In 2019, Hunter Water developed and published an Economic Level of Water Conservation (ELWC) methodology, as required by the Operating Licence. As a result, Hunter Water's annual Water Conservation Report now documents all matters related to water conservation and efficiency, demand management, recycled water and leakage management, as required by the Reporting Manual.
- Chapter 4 Performance of our asset, environmental and quality management systems.
- Chapter 5 Our customer and stakeholder performance.
- Chapter 6 A glossary of technical terms.

³ NSW Government 2017, Hunter Water Operating Licence 2017-2022.

⁴ NSW Government 2017, Hunter Water Operating Licence Reporting Manual 2017-2022.



2 SUPPLY SERVICES AND PERFORMANCE STANDARDS

2.1 Drinking water

2.1.1 Overview of drinking water supply systems

Hunter Water supplies high quality drinking water to more than half a million people in the Lower Hunter region of New South Wales: in the local government areas of Newcastle, Lake Macquarie, Maitland, Cessnock, Port Stephens, Dungog and small parts of Singleton. Our drinking water systems are managed in accordance with the Australian Drinking Water Guidelines 2011 (ADWG) framework for management of drinking water quality (referred to as 'the framework').⁵ The framework is based on the application of multiple barriers (preventive measures at all steps in the drinking water system) to ensure that consistently safe drinking water is supplied.

Drinking water systems consist of:

• Catchments

Water is collected in the natural landscape by creeks, rivers and groundwater systems. Water quality in our catchments is protected by regulation that controls the activities that are allowed within them.⁶ We also work closely with the community and stakeholders on land management and development to ensure that it is undertaken in a manner appropriate for a drinking water catchment. The locations of our drinking water catchments are shown in Figure 2-1.

• Storages

Water is stored in dams and groundwater sandbeds (aquifers) before it is treated to drinking standards. The drinking water storages that we own are: Chichester Dam, Grahamstown Dam, Tomago Sandbeds and Anna Bay Sandbeds. Some water is also sourced from the Paterson River (via Lostock Dam, which is owned by WaterNSW) and the Allyn River. The locations of our storages are shown in Figure 2-1 and capacities are provided in Table 2-1.

• Water treatment plants

We operate six water treatment plants (WTPs) that treat water to a quality suitable to safely drink. These water treatment plants are Dungog WTP, Grahamstown WTP, Lemon Tree Passage WTP, Anna Bay WTP, Nelson Bay WTP and Gresford WTP. The locations of our WTPs are shown in Figure 2-1.

• Water supply systems

The water that we supply is transported and stored within a closed distribution network. All clear water tanks and storage reservoirs within the distribution system are fully covered and regular inspections are undertaken to ensure that the integrity of the system is maintained. Security measures are in place to prevent unauthorised access to water storage facilities. Maintenance and construction activities are undertaken in accordance with procedures that are designed to ensure that drinking water quality is protected. We have backflow prevention measures in place to minimise the likelihood of backflow of potentially contaminated water from a connected property into the water supply system. The water supply systems are shown in Figure 2-2 and further described in Section 2.1.2.

We also supply and receive drinking water from outside of our area of operations. We supply a small volume of treated water to MidCoast Council in Karuah (5.7 ML in 2019-20) and can also supply and receive bulk treated water from the Central Coast.

⁵ National Health and Medical Research Council, 2016, Australian Drinking Water Guidelines 2011, – updated Aug 2018

⁶ Hunter Water Regulation 2015, Part 2 – Special Areas.



During 2019-20, we supplied 821 ML of water to the Central Coast and received 1637.1 ML from Central Coast Council's water supply system. Central Coast Council maintain a quality assurance program for its water supply systems under the *NSW Public Health Regulation 2012*. We also provided small volumes of water to private network operators within Hunter Water's area of operations, including 47 ML to Cooranbong Water, 99.7 ML to Huntlee Water, and 800 ML to Kooragang Island Water.





Source: Hunter Water

Table 2-1	Capacity of Hunter Water's water storages
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Water Source	Maximum Capacity (ML)
Chichester Dam	18,356
Grahamstown Dam	182,305
Tomago Sandbeds	60,000
Anna Bay Sandbeds	16,024
Total storage	276,685







Source: Hunter Water

2.1.2 Performance at critical control points

Where practical, water quality parameters at Critical Control Points (CCPs) are continuously monitored using a supervisory control and data acquisition (SCADA) system. In order to meet ADWG requirements, Hunter Water undertakes monthly performance reviews to confirm compliance with CCP limits. Operational limits for CCPs are set at levels that are more stringent than the critical limit. Using SCADA, alarm limits are set so that corrective action can be taken before the critical limit is reached.

Exceedance of the critical limit indicates a risk of unacceptable water quality being supplied to customers. If a critical limit is exceeded a corrective action and investigation occurs. To minimise the likelihood of exceeding critical limits, Hunter Water has implemented automatic shutdowns for key water quality parameters at all WTPs.

The performance review is applicable to Hunter Water's CCPs in place during the reporting period. Hunter Water is currently implementing a revised primary disinfection CCP at each WTP, including revised critical



limits for Chlorine Contact Time (CT) and pH as agreed with NSW Health. The revised CCP will be included in the performance review upon full implementation.

An outline of each of our water supply zones and performance at CCPs during 2019-20 is set out below. An exceedance of a CCP critical limit does not necessarily indicate that unsafe water quality was supplied to customers, rather it means that the risk threshold was exceeded and a corrective response was required. A brief explanation of each of the water treatment processes referenced in this section is included in the Glossary (see Section 6.2).

Dungog water supply system

Water from Chichester Dam is treated at Dungog WTP. Dungog WTP is a direct filtration plant with a maximum capacity of 90 ML/day. Treatment processes at the plant are:

- Raw water chlorination.
- Powdered activated carbon (PAC) dosing (event-based).
- Coagulation / flocculation.
- Filtration.
- pH correction.
- Disinfection.
- Fluoridation.

The majority of water from the Dungog WTP is fed by gravity trunk main to the Cessnock, Maitland and Newcastle areas. Water supplied to Maitland and Cessnock is re-chlorinated at the outlet of Four Mile Creek Reservoir. Water from the Chichester Trunk Gravity Main (CTGM) also gravitates to the Newcastle and Lake Macquarie areas (Grahamstown water supply zone), where it blends with water supplied from Grahamstown WTP. The estimated permanent population within the Dungog water supply system is 152,000 people. Performance at CCPs within the system is provided in Table 2-2.

Table 2-2	Dungog water	supply system:	CCPs	performance	2019-20

Critical control point	Critical limit	Compliant
Dungog WTP coagulation and filtration	Individual filters. Filtered water turbidity must not exceed 0.5 NTU for > 15 consecutive minutes at individual filter outlets.	\checkmark
Dungog WTP post-	Disinfection prior to first customer.	√
filtration disinfection	(Chlorine Contact Time (CT) must not be less than 4 min.mg/L) ^a	
	pH at clear water tank outlet must not be less than 6 or greater than 9 for > 15 consecutive minutes	\checkmark
	Free chlorine residual at clear water tank outlet must not exceed 4.5 mg/L for > 15 minutes	\checkmark
Dungog WTP fluoridation	Fluoride concentration at clear water tank outlet must not exceed 1.5 mg/L	√
Four Mile Creek reservoir chlorinator	Free chlorine residual at water main re-chlorination facilities must not exceed 4.5 mg/L for > 15 consecutive minutes	\checkmark

a) Chlorine Contact time (CT) is calculated using chlorine, flow and Clear Water Tank level data. A surrogate limit of 0.2mg/L free chlorine at the Clear Water Tank outlet applies.



Grahamstown water supply system

Water from Grahamstown Dam and the Tomago Sandbeds is treated at Grahamstown WTP. The plant has a maximum capacity of 266 ML/day and includes the following treatment processes:

- PAC dosing (event-based).
- Aeration (Tomago Sandbeds water only, see below).
- Coagulation / flocculation.
- Sedimentation.
- Filtration.
- pH correction.
- Disinfection.
- Fluoridation.

Treated water from Grahamstown WTP is pumped to Newcastle and Lake Macquarie, as well as Medowie, Stockton and Kooragang Island. The water is re-chlorinated at four locations within the Newcastle and Lake Macquarie distribution system to improve the chlorine residual in order to minimise water quality risk within the distribution system. Water from this supply zone is also pumped to the Tomaree Peninsula to form part of the supply to Port Stephens. The estimated permanent population within the Grahamstown water supply system is 399,000 people. Performance at CCPs within the water supply system is summarised in Table 2-3.

Critical Control Point	Critical Limit	Compliant
Grahamstown WTP coagulation and filtration	Filtered water turbidity must not exceed 0.5 NTU for > 15 consecutive minutes at individual filter outlets.	✓
Grahamstown WTP and mains disinfection	Disinfection prior to first customer	\checkmark
	(Chlorine Contact Time (CT) must not be less than 4 min.mg/L) ^a	
	pH at clear water tank outlet must not be less than 6 or greater than 9 for > 15 consecutive minutes	~
	Free chlorine residual post rechlorination must not exceed 4.5 mg/L for > 15 consecutive minutes	\checkmark
Grahamstown WTP fluoridation	Fluoride concentration at clear water tank outlet must not exceed 1.5 mg/L	\checkmark
Cardiff South Chlorinator	Free chlorine residual at water mains rechlorination facilities must not exceed 4.5 mg/L for > 15 consecutive minutes	✓
Elermore Vale Chlorinator	Free chlorine residual at water mains rechlorination facilities must not exceed 4.5 mg/L for > 15 consecutive minutes	✓
North Lambton Chlorinator	Free chlorine residual at water mains rechlorination facilities must not exceed 4.5 mg/L for > 15 consecutive minutes	× b
Toronto Chlorinator	Free chlorine residual at water mains rechlorination facilities must not exceed 4.5 mg/L for > 15 consecutive minutes	✓

Table 2-3 Grahamstown water supply system: CCPs performance 2019-20

a) Chlorine Contact Time (CT) is calculated using chlorine, flow and clear water tank level data. A surrogate limit of 0.25mg/L free chlorine at the clear water tank inlet and mains chlorination applies.

b) Free chlorine residual recorded at North Lambton Chlorinator exceeded 4.5 mg/L for greater than 15 minutes between 18:35 and 18:51 on 13 March 2020. Sampling and analysis was undertaken and no customer impacts were identified. Hunter Water's root-cause analysis identified matters with the control system and recommended preventative actions that are either implemented or underway.

Lemon Tree Passage water supply system

Water from the Tomago Sandbeds is treated at Lemon Tree Passage WTP. The plant has a maximum capacity of 5 ML/day and includes the following processes:

- Aeration.
- Coagulation / flocculation.
- Two stage filtration.
- pH correction.
- Disinfection.
- Fluoridation.

Treated water is pumped from Lemon Tree Passage WTP to Tanilba Bay, Mallabula, Lemon Tree Passage, Swan Bay and Karuah. The estimated permanent population supplied by this system is 9,100 people.

Performance at CCPs within the water supply system is summarised in Table 2-4.

Table 2-4 Lemon Tree Passage water supply system: CCPs performance 2019-20

Critical Control Point	Critical Limit	Compliant
Lemon Tree Passage WTP coagulation and filtration	Filtered water turbidity must not exceed 1 NTU for > 15 consecutive minutes at secondary filter outlets	✓
Lemon Tree Passage WTP disinfection	Disinfection prior to first customer (Chlorine Contact Time (CT) must not be less than 4 min.mg/L) ^a	\checkmark
	pH at clear water tank outlet must not be less than 6 or greater than 9 for > 15 consecutive minutes	✓
	Free chlorine residual at the clear water tank outlet must not exceed 4.5 mg/L for > 15 consecutive minutes. If this limit is breached, free chlorine residual is calculated at the clear water tank outlet to determine the quality of water supplied to customers.	V
Lemon Tree Passage WTP fluoridation	Fluoride concentration at clear water tank inlet must not exceed 1.5 mg/L for > 5 consecutive minutes	✓ b

a) Chlorine Contact Time (CT) is calculated using chlorine, flow and Clear Water Tank level data. A surrogate limit of 0.2mg/L free chlorine at the Clear Water Tank inlet applies.

b) If this limit is exceeded, fluoride concentration is derived at the outlet to determine the quality of water supplied to customers, i.e. to ensure that water quality supplied to customers does not exceed the ADWG guideline of 1.5 mg/L.



Anna Bay and Nelson Bay water supply system

The Anna Bay Sandbeds are located within the protected catchment of the Tomaree National Park and groundwater is naturally filtered within the sandbeds. Water is extracted using a network of production bores and treated at Anna Bay and Nelson Bay WTPs.

Each WTP can supply a maximum flow of approximately 12 ML/day using the following processes:

- aeration
- pH correction
- disinfection
- fluoridation

Water from the WTPs supplies the Tomaree Peninsula including Anna Bay, Boat Harbour, Salamander Bay, Nelson Bay, Fingal Bay, Shoal Bay, Corlette and Soldiers Point. The estimated permanent population within the water supply system is 38,400 people. Water from Grahamstown WTP can also supplement this water supply system. Performance at CCPs within the water supply system is summarised in Table 2-5.

Critical Control Point		Critical limits	Compliant
Anna Bay \ disinfection	WTP	Disinfection prior to first customer (Chlorine Contact Time (CT) must not be less than 4 min.mg/L) ^a	✓
		Free chlorine concentration at clear water tank inlet must not exceed 4.5 mg/L for > 15 minutes. If this limit is breached, free chlorine residual is calculated at the clear water tank outlet to determine the quality of water supplied to customers.	✓
		pH at clear water tank outlet must not be less than 6 or greater than 9 for > 15 consecutive minutes	√
		Turbidity at clear water tank outlet must not exceed 5 NTU for > 5 consecutive minutes	\checkmark
Nelson Bay \ disinfection	WTP	Disinfection prior to first customer (Chlorine Contact Time must be less than 4 min.mg/L) ^b	\checkmark
		pH at the clear water tank inlet must not be less than 6 or greater than 9 for > 15 consecutive minutes	\checkmark
		Free chlorine residual at clear water tank outlet must not exceed 4.5 mg/L for > 15 consecutive minutes.	√
		Turbidity at clear water tank outlet must not exceed 5 NTU for > 5 consecutive minutes	\checkmark
Anna Bay/Nelson WTP fluoridation	Bay	Fluoride concentration at clear water tank inlet must not exceed 1.5 mg/L for > 5 consecutive minutes. If this limit is exceeded, fluoride concentration is derived at the outlet to determine the quality of water supplied to customers.	\checkmark

 Table 2-5
 Anna Bay / Nelson Bay water supply system: CCPs performance 2019-20

a) Chlorine Contact Time (CT) is calculated using chlorine, flow and Clear Water Tank level data. A surrogate limit of 0.3 mg/L and 0.2 mg/L free chlorine applies at the Clear Water Tank inlets, at Anna Bay WTP and Nelson Bay WTP, respectively.

b) Chlorine Contact Time (CT) is calculated using chlorine, flow and Clear Water Tank level data. A surrogate limit of 0.3 mg/L and 0.2 mg/L free chlorine applies at the Clear Water Tank inlets, at Anna Bay WTP and Nelson Bay WTP, respectively.



Gresford water supply system

Water is extracted from the Allyn and Paterson Rivers at Gresford, and is treated at the Gresford WTP. The plant has a maximum capacity of 0.5 ML/day and includes the following processes:

- Membrane microfiltration.
- Disinfection.

Performance at CCPs within the water supply system is summarised in Table 2-6.

Critical Control Point	Critical Limit	Compliant
Gresford WTP microfiltration	Filtered water turbidity must not exceed 0.5 NTU for > 15 consecutive minutes at clear water tank inlet	\checkmark
	Calculated pressure decay rate across membranes must not exceed 10 kPA/min	✓
Gresford WTP disinfection	Disinfection prior to first customer (Chlorine Contact Time (CT) must not be less than 4 min.mg/L) ^a	\checkmark
	pH at the clear water tank inlet must not be less than 6 or greater than 9 for > 15 consecutive minutes	✓
	Free chlorine concentration at the clear water tank outlet must not exceed 4.5 mg/L for > 15 minutes.	✓

Table 2-6 Gresford water supply system: CCPs performance 2019-20

a) Chlorine Contact Time (CT) is calculated using chlorine, flow and Clear Water Tank level data. A surrogate limit of 0.2 mg/L free chlorine at the Clear Water Tank inlet applies.

2.1.3 Verification monitoring

The ADWG Drinking Water Quality Framework emphasises a preventive approach, including operational monitoring and process control, combined with verification monitoring to confirm that preventive measures have been effective: ⁷

Verification of drinking water quality provides an important link back to the operation of the water supply system and additional assurance that the preventive measures and treatment barriers in the water supply system have worked, and are working, to supply safe drinking water.

Verification monitoring is based on results of water quality samples that are representative of water supplied to customers' taps. Water quality standards specified in the ADWG are considered safe for people to drink over an entire lifetime. Therefore, licence performance is a statistical analysis of results, based on percentage compliance rather than absolute figures. In 2019-20, full compliance with regulatory requirements was achieved for verification monitoring. The performance and mean results of analysis for key microbiological and physical / chemical parameters are shown in Table 2-7, Table 2-8 and Table 2-9. Descriptions of the parameters are provided in the glossary of this report.

⁷ National Health and Medical Research Council, 2016, Australian Drinking Water Guidelines 2011– updated Aug 2018, Element five, Section 9.5, p. 140.



Parameter	Health / Aesthetic	Measure of Compliance	Performance Standard	Whole of Hunter Water 12 Months Samples	Compliant
E.coli	Health	% of samples containing < 1 Most Probable Number (MPN) per 100 mL	>98% of samples shall contain <1 MPN per 100 mL	99.89% of samples contained < 1 MPN per 100 mL	V

Table 2-7 Microbiological water quality 2019-20

Table 2-8 Key health physical / chemical analytes 2019-20

Analyte	Units of Measure	ADWG health guideline value	Performance standard (assessment over 12 months)	95th Percentile over the last 12 months	Compliant
Fluoride	mg/L	1.5	95th percentile of test	1.07	\checkmark
Chlorine	mg/L	5	results less than respective ADWG health	1.24	\checkmark
Copper	mg/L	2	guideline value	0.019	\checkmark
Lead	mg/L	0.01	-	0.001	\checkmark
Manganese	mg/L	0.5		0.017	\checkmark
Trihalomethanes	mg/L	0.25	-	0.144	\checkmark

Table 2-9 Key aesthetic physical / chemical analytes 2019-20

Analyte	Units of Measure	ADWG aesthetic guideline value	Performance standard (assessment over 12 months)	12 month average result	Compliant
Iron	mg/L	0.3	Average of test results	0.03	\checkmark
Aluminium	mg/L	0.2	ADWG aesthetic	0.042	\checkmark
Copper	mg/L	1	guideline value	0.009	\checkmark
Zinc	mg/L	3	-	0.004	\checkmark
Turbidity	NTU	5		0.3	\checkmark
True colour	HU	15	-	5	\checkmark
рН	pH units	6.5-9.2	Average of results between 6.5 and 9.2	7.58	\checkmark



2.1.4 Drinking water quality management activities and programs in 2019-20

Improvements to drinking water quality management undertaken or underway during 2019-20 are shown in Table 2-10.

ADWG Framework sub-element		Water quality objective	Activity / Program	Results / Outcomes
2.3	Hazard Identification and Risk Assessment	Identify and document hazards, sources and hazardous events.	Update of the Grahamstown WTP risk assessment.	Risk assessment update completed for Grahamstown WTP. Ongoing follow-up required to develop risk treatment plans.
2.3	Hazard Identification and Risk Assessment	Identify and document hazards, sources and hazardous events.	Update of the Anna/Nelson Bay WTPs risk assessment.	Risk assessment update completed for Anna/Nelson Bay WTPs. Ongoing follow- up required to develop risk treatment plans.
3.1	Preventive Measures and Multiple Barriers	Hygienic water main repair and construction.	Implement improved hygienic water main repair and construction standards.	New improved hygiene standards partially implemented including water quality acceptance testing, updated procedures and staff training. Ongoing efforts required to continue progress implementation coverage.
3.1	Preventive Measures and Multiple Barriers	Improved barriers to pathogen contamination.	Dungog WTP upgrades / modifications.	Completed upgrade to the filtration system (filter to waste capability), chemical dosing systems and backwash tank enclosure.
3.1	Preventive Measures and Multiple Barriers	Improved barriers to pathogen contamination.	Disinfection Optimisation Strategy.	Commenced development of DOS 1B project which includes chlorinator upgrades and improved tablet dosing at reservoirs.
4.4	Equipment Capability and Maintenance	Inspection and maintenance.	Network reservoir cleaning program.	Implementation of robotic cleaning technology.
4.1	Operating Procedures	Mitigate potential drinking water quality risks associated with the drinking water distribution network.	Mitigate potential drinking water quality risks associated with water carter operations.	Improved process for ensuring compliance with water carter quality assurance programs for all water carters used by Hunter Water.
1.2, 4.4	Formal requirements, Equipment Capability and Maintenance	Roles and responsibilities, equipment operation and maintenance.	WTP asset facility plans.	Asset facility plans developed for each WTP.
9.1	Investigative Studies and Research Monitoring	Increase understanding of emerging risks to the water supply system.	Development of management strategy for thermophilic amoeba risk.	Management strategy developed and implemented.
10.2, 12.1	Reporting, Review by Senior Executive	System reporting and management review.	Water Quality Committee.	Updated Terms of Reference for the Water Quality Committee.

Table 2-10 Drinking water quality management activities and programs 2019-20



ADW sub-e	G Framework element	Water quality objective	Activity / Program	Results / Outcomes
12.2	Improvement Plan	Communication of plan progress and effectiveness.	Improvement plan reporting.	Refreshed improvement plan report provided to senior management and NSW Health.



2.1.5 Proposed drinking water quality management activities and programs

Proposed measures to improve drinking water quality management in the future are outlined in Table 2-11.

Table 2-11 Proposed drinking water quality management activities and programs

ADW sub-e	G Framework lement	Water quality objective	Activity / Program	Scope / Expected Outcomes / Timeframe
2.3	Hazard Identification and Risk Assessment	Identify and document hazards, sources and hazardous events.	Catchment to tap risk assessment guideline.	Update guideline to provide more detail around risk assessment triggers and decision making for risk treatment plan development. Timeline: 2020-21.
2.3	Hazard Identification and Risk Assessment	Identify and document hazards, sources and hazardous events.	Drinking Water Quality Management support and guidance for drought response initiatives.	Liaise with NSW Health on key projects including Belmont WTP Drought Response Desalination, Tomago Secondary Aquifer, re-instating retired bore stations and associated coated media manganese removal process. Timeline: Ongoing.
3.1	Preventive Measures and Multiple Barriers	Evaluate alternative or additional preventive measures where improvement is required.	Water Treatment Plant master planning.	Developed master plans to cater for future demand and water quality requirements for all WTPs. Timeline: Ongoing.
3.1	Preventive Measures and Multiple Barriers	Seaham weir pool water quality.	Seaham weir pool environment rehabilitation project.	Commence project planning for Seaham weir pool environment rehabilitation project. Timeline: Ongoing.
3.1	Preventive Measures and Multiple Barriers	Hygienic water main repair and construction.	Continue implementation of improved hygienic water main repair and construction standards.	Rollout of training program, and commence implementation of auditing program. Timeline: 2020-21.
3.1	Preventive Measures and Multiple Barriers	Improved chlorine residuals across the network.	Disinfection Optimisation Strategy Stage 1B.	Delivery of project by 2021 to improve dosing/mixing at priority reservoirs, and network chlorinator upgrades. Timeline: June 2021.
3.1	Preventive Measures and Multiple Barriers	Improved barriers to pathogen contamination.	UV upgrade at Grahamstown WTP.	Develop reference design for UV upgrade at Grahamstown WTP. Timeline: 2021.
3.1	Preventive Measures and Multiple Barriers	Improved barriers to pathogen contamination.	UV upgrade at Gresford WTP.	Develop design package for UV upgrade at Gresford WTP. Timeline: 2021.
3.1	Preventive Measures and Multiple Barriers	Improved capability for organics removal.	Capability for removal of organic matter at Gresford WTP.	Develop design package for MBBR before filtration for improved removal of organic matter at Gresford WTP. Timeline: 2021.
3.2	Critical Control Points	Improved monitoring of disinfection critical control points.	Implement revised disinfection CCP at all WTPs.	Implemented at all WTPs by 2020-21.
4.4	Equipment Capability and Maintenance	Equipment operation and maintenance.	Effectiveness of algal barriers.	Investigate effectiveness of existing algal barriers for Grahamstown and Dungog. Timeline: Ongoing.



ADWG Framework sub-element		Water quality objective	Activity / Program	Scope / Expected Outcomes / Timeframe
8	Community Involvement and Awareness	Promote awareness of drinking water quality issues, two-way communication.	Catchment Management Schools Engagement Project.	Continuation of existing schools education program. Timeline: Ongoing.
9.1	Investigative Studies and Research Monitoring	Increase understanding of emerging risks to the water supply system.	Investigations to characterise risk of emerging contaminants.	Increased understanding of the risk of emerging contaminants in our systems. Timeline: Ongoing.
10.1	Management of Documentation and Records	Document information pertinent to all aspects of drinking water quality management.	DWQMS manual update.	The DWQMS manual will be reviewed and updated. Timeline: 2020.



2.1.6 Continual improvement of the Drinking Water Quality Management System in 2019-20

Senior executives at Hunter Water provide support and oversight focused on management and continuous improvement of our drinking water systems. Drinking water quality improvement initiatives are documented, prioritised and tracked in the drinking water quality improvement plan (DWQIP). Example improvements that were undertaken in 2019/20 include the following:

- Dungog WTP filter to waste and hazardous chemical storage upgrade to improve plant reliability, water quality, safety and environmental performance.
- Chichester Dam destratification system upgrade.
- Hygienic water main repair and construction standards.
- Network reservoir maintenance using robotic cleaning technology.
- Water main flushing using water conservation technology to save water.
- Strategy for management of thermophilic amoeba risk.
- Formalised process for WTP process flow diagram verification.

During 2019/20, Hunter Water completed 90% of actions prioritised in the DWQIP.

2.1.7 Significant changes to the Drinking Water Quality Management System

There were no proposed significant changes to the Drinking Water Quality Management System during 2019-20.

Hunter Water continues to consult with NSW Health on the implementation of previously proposed and agreed changes including:

- Changing the disinfection CCP at all WTPs as agreed with NSW Health. The proposed disinfection CCP includes a revised concept for monitoring and calculating the product of free chlorine residual and contact time (CT in mg-mins/Litre) as well as a new critical limit based on a Ct of 15 mg-mins/Litre.
- Changing the pH CCP critical limit at all WTPs as agreed with NSW Health. The revised pH CCP critical limit is proposed to be pH greater than nine for 15 minutes.

2.1.8 Non-conformances with the Drinking Water Quality Management System

There were no non-conformances with the Drinking Water Quality Management System during 2019-20.



2.2 Recycled water

Hunter Water manages its recycled water schemes in a way that protects human health, the environment and complies with customer agreements as well as other relevant regulatory requirements. Our 2017-2022 Operating Licence⁸ requires us to maintain and implement a system for managing recycled water quality that is consistent with the Australian Guidelines for Water Recycling 2006 (AGWR). A key component of complying with the AGWR is the implementation of a risk-based management framework, including CCPs.

The AGWR requires Recycled Water Quality Management Plans (RWQMPs) to be developed for all recycled water schemes. A RWQMP is a documented system for managing the production and supply of recycled water and consolidates all essential information surrounding the operation and management of the recycled water system.

We have developed RWQMPs for all our recycled water schemes, addressing the 12 elements as described in the AGWR. We undertake a rolling review process for our RWQMPs.

This section of the report describes:

- Hunter Water's recycled water schemes.
- Performance at CCPs during 2019-20.
- Recycled water quality management activities completed during 2019-20.
- Proposed future activities.
- Continual improvement activities undertaken during 2019-20.
- Significant changes made to the Recycled Water Quality Management System (RWQMS) in 2019-20.
- Any non-conformances with the RWQMS.

2.2.1 Overview of recycled water schemes

During 2019-20 Hunter Water's recycled water schemes provided recycled water to external customers from the Branxton, the Branxton, Cessnock, Clarence Town, Dora Creek, Dungog, Edgeworth, Karuah, Kurri Kurri, Morpeth and Shortland Shortland Wastewater Treatment Works (WWTW). Two new schemes were commissioned providing dual reticulation reticulation recycled water from the Morpeth and Farley Recycled Water Treatment Plants (RWTP). The location of our location of our recycled water schemes are shown in

Figure 2-3.

Recycled water source	Recycled water use	2019-20 reuse volumes (ML)
Branxton WWTW	Branxton Golf Course and The Vintage Golf Course	204
Cessnock WWTW	Cessnock Golf Course	60
Clarence Town WWTW	Clarence Town Irrigation Scheme	28
Dora Creek WWTW	Eraring Power Station	1246
Dungog WWTW	Local farmer	240
Edgeworth WWTW	Waratah Golf Course	106
Farley RWTP	Gillieston Heights dual reticulation	36
Karuah WWTW	Karuah Irrigation Scheme	137
Kurri Kurri WWTW	Kurri Kurri Golf Course and Kurri Kurri TAFE	61

⁸ NSW Government 2017, Hunter Water Operating Licence 2017-2022.



Shortland WWTW	Water Utilities Australia	3651
Morpeth WWTW	Easts Golf Course and local farmer	118
Morpeth RWTP	Chisholm dual reticulation	21
Total		5,908 ^a

a) Total excludes use by Hunter Water onsite at WWTW and indirect agricultural reuse.







2.2.2 Performance of critical control points

The following sections describe performance at CCPs. A brief explanation of each of the wastewater treatment terms referenced is included in the glossary.

Branxton wastewater treatment works

Branxton WWTW receives wastewater from Branxton East, Branxton and Greta. Influent entering the system is primarily residential (domestic) with only a small volume of trade waste flows from retail outlets, hotels and small automotive repair garages.

Branxton WWTW includes the following processes:

- Screening and grit removal.
- Bioreactor.
- Membrane filtration.
- Chlorination.



Recycled water from Branxton WWTW is supplied to Branxton Golf Course and The Vintage Golf Course. Performance at CCPs within the Branxton WWTW is shown in Table 2-13.

Table 2-13 Branxton	WWTW: recyc	led water scheme	CCPs performanc	e, 2019-20

Critical control point	Critical limit	Compliant
Membranes filtration	Turbidity of permeate at each individual membrane train must not exceed 0.5 NTU for > 120 seconds	\checkmark
Chlorination system	Chlorine contact time must be at least 8.3 min.mg/L	\checkmark
	pH upstream of chlorine contact tank must not exceed 9	\checkmark



Cessnock wastewater treatment works

Cessnock WWTW receives wastewater from the Cessnock local government area. Influent entering the system is primarily residential (domestic). There are also a number of commercial trade waste customers discharging to the system.

Cessnock WWTW includes the following processes:

- Screening.
- Clarification.
- Trickling filters.
- Maturation ponds.
- Dissolved air floatation.
- UV disinfection.



Recycled water from the Cessnock WWTW is supplied to the Cessnock Golf Course. Performance at CCPs within the Cessnock WWTW is shown in Table 2-14.

Critical control point		Critical limit	Compliant
Lagoon ponding	Flow rate	<280 L/s for more than 60minutes when supplying recycled water to the customer	✓
UV System	UV operation	UV unit must be on when supplying recycled water to the customer	\checkmark
		Bypass valve must be closed when supplying recycled water to the customer	\checkmark
	UV calculated dose	>32mJ/cm ² with UV transmissivity at >40% at ADWF of 12ML/d when supplying recycled water to the customer	✓
	UV lamps	Minimum of 30 lamps operating when supplying recycled water to the customer	~
	UV flow rate	<140L/s when pumping recycled water to the customer	\checkmark

Table 2-14	Cessnock WWTW:	recycled water sche	eme CCPs performance	2019-20
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Clarence Town wastewater treatment works

Clarence Town WWTW receives wastewater from the township. Influent entering the system is primarily residential (domestic).

Clarence Town WWTW includes the following processes:

- Oxidation ponds.
- Maturation ponds.
- Effluent storage ponds.



Recycled water from the Clarence Town WWTW is supplied to an irrigation scheme. Performance at CCPs within the Clarence Town WWTW is shown in Table 2-15.

Table 2-15	Clarence Town V	/WTW: recycled	water scheme	CCPs performance	, 2019-20
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Critical con	trol point	Critical limit	Compliant
Lagoon	Flow rate	<252 kL/d when irrigating at the reuse area	\checkmark
ponding	Valve position	V1102 must be closed	\checkmark
		V1100 must be open when irrigating on the reuse area	✓



Dora Creek wastewater treatment works

Dora Creek WWTW receives wastewater from Bonnells Bay, Silverwater, Morisset Park, Yarrawonga Park and Sunshine Brightwaters. Influent entering the system is primarily residential (domestic) with a number of trade waste customers also discharging to the treatment plant.

Dora Creek WWTW includes the following processes:

- Screening.
- Grit removal.
- Bioreactor.
- Clarification.
- Effluent storage dam.



Recycled water from Dora Creek WWTW is supplied to the Eraring Power Station. Performance at CCPs within the Dora Creek WWTW is shown in Table 2-16.

Table 2-16	Dora Creek WWTW: re	cycled water scheme C	CCPs	performance,	2019-20
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Critical control point	Critical limit	Compliant
Secondary treatment process	Flow rate < 367 L/s for more than 60 minutes	× a
Effluent balance dam ponding	Flow rate < 734 L/s for more than 60 minutes	\checkmark
a) A wet weather event resulted in	high flows being received at the Dora Creek WWTW between	7 February 2020 and 9

a) A wet weather event resulted in high flows being received at the Dora Creek WWTW between 7 February 2020 and 9 February 2020. During the 3 days, the WWTW received approximately 66 ML of inflows. This is compared to the average dry weather flow of 4ML/day. This resulted in a bypass of the secondary treatment process of 5.32ML during the high flow period on the 9th of February. During the wet weather event the effluent holding pond (150ML total size) increased from 60% to 90% of its capacity. The recycled water customer received 2.29 ML of recycled water during the wet weather bypass event. The recycled water provided to the customer would have been largely diluted with stormwater flows. The customer also undertakes further membrane filtration and reverse osmosis treatment on their site, therefore the event did not pose a significant risk.



Dungog wastewater treatment works

Dungog WWTW receives influent into the system that is primarily residential (domestic).



The Dungog WWTW includes the following processes:

- Screening.
- Sedimentation.
- Trickling filters.
- Sludge digesters.
- Maturation ponds.

Recycled water from Dungog WWTW is supplied to a local farmer. Performance at the CCP within the Dungog WWTW is shown in Table 2-17.

Table 2-17 Dungog WWTW: recycled water scheme CCP performance, 2019-20

Critical control point	Critical limit	Compliant
Effluent reuse pond	Flow rate < 520kL/d for more than 4 days and reuse customer irrigating	\checkmark



Edgeworth wastewater treatment works

Edgeworth WWTW receives wastewater from the Charlestown, Cardiff and Speers Point sewer catchment area. Influent entering the system consists primarily of residential (domestic) wastewater. There are also a number of commercial and industrial trade waste customers discharging to the system.

Edgeworth WWTW includes the following processes:

- Screening.
- Bioreactor.
- Clarification.
- UV disinfection.



Recycled water from the Edgeworth WWTW is supplied to the Waratah Golf Course. Performance at CCPs within the Edgeworth WWTW is shown in Table 2-18.

Critical contro	ol point	Critical limit	Compliant
Secondary	Flow rate	<873L/s for more than 60 minutes when pumping to customer	✓
Treatment	Aeration monitoring	0 m ³ /h in either tank for more than 8 hours while customer is taking recycled water	\checkmark
UV System	UV operation	Must be on when reuse customer is being supplied recycled water	✓
	UV lamps	Minimum of 18 lamps per bank operating when supplying recycled water to the customer	\checkmark
	UV calculated dose	Minimum dose 40 mJ/cm ² with UV transmissivity of 40% when reuse customer is being supplied with recycled water	\checkmark
	UV flow rate	<80L/s per unit for 60 minutes when pumping recycled water to the customer	\checkmark
		<160L/s for both units for 60 minutes when pumping recycled water to the customer	\checkmark

Table 2-18 Edgeworth WWTW: recycled water scheme CCPs performance, 2019-20



Farley recycled water treatment plant

Farley RWTP includes the following processes:

- Membrane filtration.
- UV disinfection.
- Chlorination.



Farley RWTP receives secondary treated effluent from the Farley WWTW. The treated recycled water is used for the dual reticulation scheme at Gillieston Heights.

Performance at CCPs within the Farley RWTP is shown in Table 2-18.

Table 2-19 Farley RWTP: recycled water scheme CCPs performance, 2019-20

Critical control	ol point	Critical limit	Compliant
Membrane Filtration	Turbidity	Membrane permeate turbidity > 0.15 NTU for > 15 consecutive minutes.	\checkmark
	Rate of decay in pressure differential	The membrane integrity test (MIT) result correlated with 4.0 log10 removal of 3 micron particles is > 3.9 kPa per 5 min at a test pressure of 130 kPa.	✓
UV System	Online UV intensity meter and UV	UV adenovirus RED < 65.3 mJ/cm2 for > 15 consecutive minutes.	\checkmark
	Transmissivity (UVT) analyser	UVT is $< 40.1\%$ for > 15 consecutive minutes.	\checkmark
Chlorination	Free chlorine concentration (to meet the Ct requirements)	Ct < 22 min•mg/L for > 15 consecutive minutes.	✓
	pH range	pH > 8.5 for > 15 consecutive minutes.	\checkmark



Karuah wastewater treatment works

Karuah WWTW receives wastewater from the Karuah Township. Influent entering the system is primarily residential (domestic).

Karuah WWTW includes the following processes:

- Screening.
- Bioreactor.
- UV disinfection.
- Effluent storage dam.



Recycled water from Karuah WWTW is supplied to an irrigation scheme. Performance at CCPs within the Karuah WWTW is shown in Table 2-20.

Table 2-20	Karuah WWTW: rec	ycled water scheme CC	Ps performance, 2019-20
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Critical contro	ol point	Critical limit	Compliant
Biological treatment	Inlet flow meter	<48.3 L/s for more than 60 minutes when irrigation is occurring	\checkmark
	Aeration control	No aerators available/running during six consecutive IDEA cycles	✓
UV System	UV operation	UV bank must be on when irrigation is occurring	\checkmark
	UV calculated dose	>35mJ/cm2 with a transmissivity of greater than 55% at 44L/s when irrigation is occurring	\checkmark
	UV flow rate	<44L/s when irrigation is occurring	\checkmark



Kurri Kurri wastewater treatment works

Kurri Kurri WWTW receives wastewater from the Kurri Kurri catchment area. Influent entering the system is primarily residential (domestic).

Kurri Kurri WWTW includes the following processes:

- Screening.
- Bioreactor.
- Clarification.
- Tertiary filtration (dual media).
- UV disinfection.



Recycled water from the Kurri Kurri WWTW is supplied to the Kurri Kurri TAFE and Kurri Kurri golf course. Performance at CCPs within the Kurri Kurri WWTW is shown in Table 2-21.

Critical control point		Critical limit C	Compliant
Biological treatment	Inlet flow meter	<172 L/s for more than 60 minutes when the golf course is pumping recycled water	✓
	Aeration process	Air flow rate 0 m3/h for no more than 8hrs when pumping to the Golf course or effluent storage ponds	✓
Media filtration	Filter lift flow	<172 L/s for more than 60 minutes when pumping to the golf course or effluent storage ponds	\checkmark
UV System	UV operation	Must not be off for more than 60 minutes when pumping to the golf course or Kurri TAFE storage pond	✓
	UV lamps	At least 18 lamps per bank must be on when pumping to the Golf course or Kurri TAFE storage ponds	✓
	UV calculate dose	d >35mJ/cm2 for 60 minutes when pumping to the golf course or Kurri TAFE storage ponds	✓
	UV flow rate	<400L/s when pumping to the golf course or Kurri TAFE storage ponds	√

Table 2-21 Kurri Kurri WWTW: recycled water scheme CCPs performance, 2019-20



Morpeth wastewater treatment works

Morpeth WWTW receives wastewater from Morpeth, Metford, Thornton, Tenambit, Ashtonfield, Beresfield, East Maitland and parts of Maitland. Influent entering the system is primarily residential (domestic).

Morpeth WWTW includes the following processes:

- Screening.
- Bioreactor.
- Clarification.
- UV disinfection.
- Maturation ponds.



Recycled water from Morpeth WWTW is supplied to a local farmer and golf course. Performance at CCPs within the Morpeth WWTW is shown in Table 2-22.

	Table 2-22	Morpeth WWTW: rec	vcled water scheme C	CPs performance, 2019-20
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Critical control point		Critical limit	Compliant	
Secondary treatment processes	Biological treatment flow rate	< 500L/s when valve to maturation pond is open	✓	
UV System	UV operation	Must be on when valve to the maturation pond is open	√	
	Flow rate through UV	< 500L/s when valve to maturation pond is opened	√	
	UV calculated dose	>32 mJ/cm ² with UV transmissivity at 40%	√	
	UV operation	Must be at least 48 out of 60 lamps when maturation pond valve is open and reuse customer is pumping	√	
Lagoon ponding	Inlet flow rate	<500 L/s when maturation pond valve is opened	✓	

Morpeth recycled water treatment plant

Morpeth RWTP receives secondary treated effluent from the Morpeth WWTW. The treated recycled water is used for the dual reticulation scheme at Chisholm.

Morpeth RWTP includes the following processes:

- Membrane filtration.
- UV disinfection.
- Chlorination.



Performance at CCPs within the Morpeth RWTP is shown in Table 2-23.

Table 2-23	Morpeth RWTP: rec	ycled water scheme	CCPs performance, 2019-2	20

Critical control point		Critical limit	Compliant
Membrane Filtration	Turbidity	Membrane permeate turbidity > 0.15 NTU for > 15 consecutive minutes.	\checkmark
	Rate of decay in pressure differential	The membrane integrity test (MIT) result correlated with 4.0 log10 removal of 3 micron particles is > 3.9 kPa per 5 min at a test pressure of 130 kPa.	✓
UV System	Online UV intensity meter and UV	UV adenovirus RED < 65.3 mJ/cm2 for > 15 consecutive minutes.	√
	analyser	UV I is $< 40.1\%$ for > 15 consecutive minutes.	\checkmark
Chlorination Free chlorine Ct < 22 min•mg/L for > concentration (to meet the Ct requirements)		Ct < 22 min•mg/L for > 15 consecutive minutes.	✓
	pH range	pH > 8.5 for > 15 consecutive minutes.	\checkmark



Shortland wastewater treatment works

The Shortland WWTW serves the communities of Sandgate, Shortland, Birmingham Gardens and Maryland as well as drawing in effluent from the Burwood catchment via the Newcastle 10 wastewater pumping station (WWPS). Influent entering the system is largely residential (domestic).

Shortland WWTW includes the following processes:

- Screening.
- Activated sludge secondary treatment via two intermittently decanted aerated lagoons (IDAL).
- Chlorination.
- Dechlorination (prior to environmental discharge).

Effluent from Shortland WWTW is supplied to the Mayfield West Advanced Water Treatment Plant owned by Water Utilities Australia. The Shortland WWTW does not have CCP requirements as the additional recycled water treatment is undertaken at the advanced water treatment plant.



2.2.3 Recycled water quality management activities and programs 2019-20

Improvements to recycled water quality management undertaken during 2019-20 are described in Table 2-24.

AGWR Framework sub-element		Recycled water objective	Activity / Program	Results / Outcomes
2.4	Hazard identification and risk assessment	Undertake a risk assessment.	Identify and document hazards and hazardous events, estimate the level of risk and determine preventive measures.	Risk assessments were undertaken on the dual reticulation schemes for Chisholm and Gillieston Heights.
3.2	Critical control points	Document the critical control points (CCP), critical limits and target criteria.	Creation of a CCP response plan.	Veolia has documented CCP response requirements.
5.1	Verification of recycled water quality	Recycled water quality monitoring.	Update the Recycled Water Quality Monitoring Plan.	Plan has been updated to include new dual reticulation schemes.
6.2	Incident and emergency response protocols	Document incident protocols.	Update Recycled Water Incident Notification and Response Procedure.	New procedures created to include the dual reticulation schemes.
6.2	Incident and emergency response protocols	Test incident protocols.	Perform a mock incident.	A mock incident was performed to test the newly created dual reticulation procedures. The incident involved multiple scenarios including a water quality non- compliance and a suspected cross connection incident.
10.1	Recycled water quality management plans	Documentation of all aspects of recycled water quality management.	Complete the recycled water quality management plans for the Chisholm and Gillieston Heights dual reticulation projects.	The management plan has been developed and received to the satisfaction of NSW Health.

 Table 2-24
 Recycled water activities and programs 2019-20



2.2.4 **Proposed recycled water quality management activities and programs**

Proposed measures to improve recycled water quality management in the future are outlined in Table 2-25.

AGWR Framework sub-element		Recycled water objective	Activity / program	Scope / expected outcomes / timetable
2.4	Hazard identification and risk assessment	Undertake a risk assessment.	Identify and document hazards and hazardous events, estimate the level of risk and determine preventive measures.	Review and update risk assessments. Timeline: 2020-21.
6.2	Incident and emergency response protocols	Test incident protocols.	Perform a mock incident.	Test the incident protocols by completing a mock incident scenario. Timeline: Dec 2020.
7.2	Operator, contractor and end user training	Identify training needs.	Update training for CCP response procedures.	Training has been updated and the rollout has commenced. Timeline: Ongoing.
10.1	Recycled water quality management plans	Document all aspects of recycled water quality management.	Review and update the Corporate RWQMP.	Bring together all aspects of recycled water management at a corporate level. Timeline: Dec 2020.
10.1	Recycled water quality management plans	Document all aspects of recycled water quality management.	Complete the recycled water quality management plans for the Dungog WWTW upgrade.	Bring together all aspects of recycled water management for the Dungog WWTW scheme. Timeline: Dec 2020.
12.2	Recycled water quality improvement plans	Ensure the plan is communicated and implemented and that the improvements are monitored for effectiveness	Complete the recycled water quality improvement plan actions.	Successful completion of improvement actions. Timeline: Ongoing.

 Table 2-25
 Proposed recycled water activities and programs


2.2.5 Continual improvement of the Recycled Water Quality Management System in 2019-20

Recycled water quality improvement initiatives are documented in the Recycled Water Quality Improvement Plan (RWQIP) and prioritised and reported through monthly cross-divisional recycled water quality meetings, as a standing agenda item. Example improvements that were conducted over this period include:

- Review of incident procedures and completion of a mock incident.
- Review of the Hunter Water Recycled Water Validation Report.

The monthly recycled water quality meetings also consider factors such as:

- Quality and supply issues.
- Audit outcomes.
- Training.
- Monitoring and reporting.

Findings and actions from the recycled water quality meetings are communicated to and reviewed by senior management on an as required basis.

Hunter Water's executive management team (EMT) reviewed all findings, results and reports from IPART's operational audit. Hunter Water developed action plans to address recommendations and findings, including the allocation of additional resources as required. Key EMT members are involved in quarterly liaison meetings with NSW Health to review the effectiveness of the RWQMS and discuss operational issues.

We ensure resources are dedicated to the development, review and implementation of the RWQMS through our recycled water quality meetings and a dedicated RWQMS coordinator. All Hunter Water management, employees and contractors involved in the supply of recycled water are responsible for understanding, implementing, maintaining and continuously improving the RWQMS.

2.2.6 Significant changes to the Recycled Water Quality Management System

Hunter Water implemented three new CCPs for the supply of dual reticulation water to Chisholm and Gillieston Heights. The CCP's for the schemes are: Membrane Filtration, UV disinfection and Chlorination. Hunter Water liaised with NSW Health in relation to the development of these CCP's. IPART's 2019 operating licence audit included the Chisholm scheme.

2.2.7 Non-conformances with the Recycled Water Quality Management System

There were no non-conformances with the RWQMS during 2019-20.



2.3 System performance standards

The Operating Licence sets the service levels that customers can expect from Hunter Water in three core areas: water pressure, water continuity and wastewater overflows. Performance against licence limits is described below. Figure 2-4 to Figure 2-8 show results against the standard over the past five years.

During 2019-20 Hunter Water also undertook customer research to inform a review of system performance standards and rebates, which may form part of the end of term licence review prior to reissue (refer to section 5.3 for further details).

2.3.1 Water pressure standard

Hunter Water must ensure that no more than 4,800 properties experience a water pressure failure in a financial year.⁹



Figure 2-4 Water pressure failures

Note: Data for 2017-18 has been revised (from 2,487) due to an error in reporting, and therefore does not align with data reported in Hunter Water's 2017-18 Compliance and Performance Report.

Hunter Water met the performance requirement of this standard for 2019-20, with a total of 787 properties experiencing low pressure. This was significantly below the limit of 4,800.

The number of properties affected in 2019-20 was lower than the previous five years. This was a result of the implementation of water restrictions which significantly reduced water consumption over summer, reducing low pressure impacts in our network.

Water pressure failures occur for a range of reasons including:

• Customer water usage during periods of high water demand, which can be seasonal (i.e. higher demands in summer compared to winter), diurnal (peak demand periods in morning and evening) and weather related (e.g. during periods of extreme hot and dry weather).

⁹ NSW Government, 2017, Hunter Water Corporation Operating Licence 2017-2022, Clause 3.3.1



- Location of customer properties, including properties that are located close to water network reservoirs and therefore do not have sufficient elevation difference between the property and the reservoir.
- Network design and configuration, such as older parts of the network that were not designed to current standards or areas where water demand has increased over time with increased development ahead of system upgrades.

2.3.2 Water continuity standards

Hunter Water must ensure that in a financial year:10

- 1. No more than 10,000 properties experience an unplanned water interruption that lasts more than 5 continuous hours; and
- 2. No more than 5,000 properties experience 3 or more unplanned water interruptions that each lasts more than 1 hour.



Figure 2-5 Unplanned interruptions > 5 hours

Hunter Water met the performance requirement of the water continuity standard for 2019-20, with a total of 5,114 properties experiencing unplanned water interruptions exceeding five hours compared with the limit of 10,000. Our performance in 2019-20 was below the rolling five year average and an improvement compared to 2018-19. Performance can be quite variable year to year, with the metric being primarily influenced by water main breaks.

Watermain breaks can occur as a result of asset condition and performance as well as weather conditions. The number of properties impacted by an unplanned water interruption is also influenced by network configuration. The duration of the unplanned water interruption is affected by the location and complexity of the required repair, resource availability, job prioritisation, and the condition of and access to valves.

Figure 2-6 Multiple unplanned interruptions

¹⁰ NSW Government, 2017, Hunter Water Corporation Operating Licence 2017-2022, Clause 3.3.2





We recorded 2,152 properties that experienced three or more unplanned outages during 2019-20. The result was above our five year average for this measure but well below the limit of 5,000. The increase in 2019-20 was primarily due to several repeat interruptions which each affected a large number of customers.

We manage our performance through water mains replacements. Our planning team examines water main failure history and model likely future performance. This helps mitigate the likelihood of repeat events.



2.3.3 Wastewater overflow standards

Hunter Water must ensure that in a financial year:11

- 1. No more than 5,000 properties (other than public properties) experience an uncontrolled wastewater overflow in dry weather.
- 2. No more than 45 properties (other than public properties) experience three or more uncontrolled wastewater overflows in dry weather.

Figure 2-7 Wastewater overflows



Note: Minor revisions have been made to data for 2014-15, 2015-16 and 2017-18 due to a reporting error and therefore does not align with data reported in Hunter Water's 2017-18 Compliance and Performance Report.

Commentary

Dry weather overflows affecting private properties were the lowest in five years. The number of incidents is slightly lower than last year and is significantly lower than the standard.

Factors influencing dry weather overflows include asset condition, foreign objects being flushed into the sewer system and tree roots entering sewerage mains causing blockages.



Figure 2-8 Multiple wastewater overflows

Commentary

This indicator measures repetitive impact to private properties.

Multiple overflows affecting private properties were the lowest in five years. The number of incidents remains significantly lower than the standard.

¹¹ NSW Government, 2017, Hunter Water Corporation Operating Licence 2017-2022, Clause 3.3.3



2.3.4 Changes to Hunter Water's area of operations

There were no changes to Hunter Water's area of operations in 2019-20.



3 WATER CONSERVATION

This chapter reports on Hunter Water's compliance with clause 2.1.2 of the Operating Licence Reporting Manual¹² in terms of providing an estimate of the maximum reliable quantity of water that Hunter Water can supply each year from existing water storages based on the yield definition and methodology developed as part of the 2014 Lower Hunter Water Plan (LHWP).

Our Operating Licence Reporting Manual (2017-2022) outlines that until Hunter Water has its new Economic Level of Water Conservation (ELWC) method approved by IPART, it must convey its compliance and performance with the Water Conservation target in this report. Since the ELWC method has now been approved, as per section 2.1.1 of the Reporting Manual, Hunter Water will be submitting a separate annual Water Conservation Report. This separate report will meet the Reporting Manual requirements by detailing:

- Hunter Water's performance against its water conservation work program in 2019-20.
- The next five financial year's water conservation strategies, targets, options and activities.
- Any changes to the water conservation activities identified in previous reports.
- How Hunter Water's water conservation activities relate to the Lower Hunter Water Security Plan.
- Information on water leakage, volume of recycled water sourced and the quantity of Drinking Water drawn by Hunter Water from all sources (GL/year).

3.1 Reliable quantity of water available from existing storages (yield)

The NSW Department of Industry (then Metropolitan Water Directorate) led a whole-of-government approach to developing the Lower Hunter Water Plan (LHWP) which was released in April 2014. A key driver for the LHWP was to ensure water security during drought and reliable water supplies to meet the needs of a growing population and business activity.

The modelling that underpins the LHWP decision making process takes into account all of the relevant factors that are listed in the Operating Licence,¹³ being:

- The capacity of the water storages, and the rates of depletion and recovery of water storages at current rates of consumption.
- Climatic data, trends and projections.
- Supply to and/or from areas outside the area of operations.
- Constraints on extraction of water from the environment, including those imposed by licences and approvals under the Water Act 1912 (NSW), the *Water Management Act 2000 (NSW)* and conditions in the relevant water sharing plans.

An important part of the LHWP planning process was to define the level of service standards, such as the maximum acceptable frequency and duration of water restrictions and the risk of reaching critically low storage levels. The maximum amount of water that can be supplied each year without exceeding the level of service standards is referred to as the 'yield'.

Hunter Water calculates yield in accordance with the methodology that was developed in the 2014 LHWP. This methodology was endorsed through the governance structure of the 2014 LHWP.

The level of service standards were:

¹² NSW Government 2017, Hunter Water Operating Licence Reporting Manual 2017-2022, clause 2.1.2.

¹³ NSW Government 2017, Hunter Water Operating Licence 2017-2022.



- Frequency of restrictions not to be more than once in 10 years on average.
- Duration of restrictions to be not more than 5 per cent of the time.
- The chance of reaching a very low level of storage that is near empty to be not more than 1 in 10,000.

Current modelling indicates that the Lower Hunter storages can supply an average of 76 billion litres of water each year without exceeding the 2014 LHWP level of service standards.

The level of service standards, and the associated yield, are to be reviewed with each major update of the LHWP. The first major update of the plan is currently underway and due to be completed in 2021.



4 ORGANISATIONAL SYSTEMS MANAGEMENT

This chapter provides an overview of the performance of three of our management systems in 2019-20: Asset Management System (AMS), Environmental Management System (EMS) and Quality Management System (QMS). For each management system, we report on the programs and activities completed during the year and the outcomes of these activities. We also report on: proposed future programs and activities, any significant changes made to the systems, and any major non-conformances during 2019-20.

4.1 Asset Management System

4.1.1 Overview of Hunter Water's Asset Management System

Our physical assets comprise of water, wastewater, recycled water and stormwater drainage systems. Given the asset-intensive nature of the organisation, asset management is critical in determining the level of service provided to customers, compliance with regulations that aim to protect the environment and human health, the cost of services and also our efficiency and financial performance.

The objective of the AMS is to ensure that we have in place the framework, processes, procedures and resources needed to effectively manage physical assets to support the achievement of business objectives.

Our 2017-2022 Operating Licence requires that we maintain and implement an Asset Management System to ensure that our assets continue to fulfil their intended functions. The Operating Licence required Hunter Water to develop an AMS by 31 December 2017 that is consistent with the Australian Standard AS ISO 55001:2014. The AMS was to be fully implemented by 1 July 2018. This was accomplished as required during the 2017-18 year, with external verification of this achievement demonstrated through certification.

Hunter Water was the first urban Australian water authority to be certified to the new ISO 55001:2014 standard. This AMS provides the framework to optimally manage asset lifecycles to achieve the agreed outcomes for customers, the environment and the community.

ISO 55000:2014 describes an asset as "an item, thing or entity that has potential or actual value to an organisation" and that: "asset management is the coordinated activity of an organisation to realise the value from its assets".

Effective asset management is essential to providing services in the most cost-effective manner and demonstrating this to customers, regulators and other stakeholders. The organisational benefits of asset management include:

- Improved governance and accountability.
- Enhanced service management and customer satisfaction.
- Improved risk management.
- Improved financial efficiency and affordability for customers.
- Sustainable creation and operation of assets.

The AMS is one of five certified management systems within Hunter Water's overall integrated management system (along with safety, environmental, quality and information security). The key elements of ISO 55001 are:

- Organisational context and leadership.
- Planning.
- Operation.
- Performance evaluation.
- Improvement.



Our AMS is guided by both our Asset Management Policy and Strategic Asset Management Plan. These strategic plans provide guidance on our asset management principles to:

- Enable the sustainable growth of the region.
- Provide safe, high quality and affordable services to the community.
- Provide a resilient water supply that withstands drought and enables growth.
- Take a responsible and sustainable approach to the protection of the environment and public health.
- Seek innovative solutions and challenge traditional methodologies across the asset life cycle.
- Understand customer, consumer and community needs and expectations.
- Comply with all legislative and regulatory requirements.
- Minimise customer prices and ensure financial sustainability.
- Maintain an investment grade credit rating.
- Ensure we have a workforce that embraces learning, innovation and change.

The scope of our AMS incorporates both the physical assets and asset lifecycle processes required to provide water, wastewater, recycled water and stormwater drainage services. The following assets are covered by the AMS: raw water, treatment, water network, wastewater network, recycled water, stormwater, electrical, and telemetry and SCADA.

4.1.2 Asset management activities and programs, 2019-20

During 2019-20, we successfully completed an ISO 55001:2014 re-certification audit of our certified AMS. In addition, an internal audit was conducted focusing on our critical assets and capital portfolio management.

Prior to Hunter Water achieving certification, we have historically implemented asset management activities and have been involved in both water industry assessments (Aquamark and WSAA) and broader asset management industry learnings (Australian Asset Management Council). However, the ISO 55001 transition required movement beyond technical lifecycle activities to a management system approach which incorporates strategic alignment, document control, competency, communication and awareness.

The AMS initiatives undertaken through 2019-20 include a combination of improved management system governance as well as system processes and procedures. Key activities and outcomes are described in Table 4-1.



AMS Initiative	Activity / Program	Results / Outcomes
Asset management system	AMS re-certification audit.	During 2019-20, we successfully completed an ISO 55001:2014 re-certification audit of our AMS.
	Asset management leadership.	AMS review is ongoing by executive managers in which the strategic elements of the AMS are evaluated and improvement initiatives assessed and implemented.
_		In addition, the asset management steering committee (group managers) has been maintained and continues to review key areas for improvement at a technical level.
	Strategic directions.	Investment priorities aligned to IPART price submission, which was completed during 2019-20.
	Critical assets audit.	As part of our internal audit plan, a critical assets audit was conducted focusing on effectiveness of key controls to manage identification, oversight and maintenance of our critical assets.
	Capital portfolio.	Internal audit was conducted focusing on our capital portfolio management.
	Treatment planning & operations internal audit.	Internal audit was conducted focusing on our processes for managing assets within Treatment Planning & Treatment Operations.
	Technical change.	Technical change management is ongoing to effectively manage risks.
	Enterprise risk management.	The AMS has ongoing review and incorporates updated risk appetite statements for the nominated risk profiles and objectives within its approach to asset risk management.
	Stakeholder & community engagement.	Continuing to innovate in our approach to stakeholder, customer and community engagement, with a suite of initiatives. This includes the Love Water program. These initiatives are integrated into the AMS through asset planning/creation and managing operational community and customer impacts.
	Awareness and training.	We have revised and updated our asset management awareness and training, which is undertaken through the employee induction process, as well as through staff and contractor training.
	Competency based training.	Our Civil Maintenance and Intelligent Networks groups have both developed in-house competency-based training modules to ensure that staff possess the various essential skills and competencies in each workplace environment ensuring high levels of customer service and work health safety.
	Dams.	Updating and improving our dam safety emergency monitoring procedures and plans, along with transitioning our systems towards the requirements of the new Dams Safety Regulations.
	Civil Maintenance System application upgrade.	Hunter Water's civil maintenance IT platform is in the process of an upgrade to ensure ongoing reliability and successful linkage to a wider hardware/software IT services initiative (FSM program).
Asset planning	Water Resilience Program.	Improving our planning for water security by expanding the planning philosophy to incorporate adaptive planning, scenario planning, systems thinking and opportunity thinking principles related to water conservation, integrated water cycle management and water source augmentations.
	Sustainable wastewater.	Expanding our traditional wastewater planning to consider medium and long term opportunities for potential waste to energy solutions, improved biosolids management, recycled water systems and carbon neutrality.
	Climate change adaptation strategy.	Refined our Climate Change Adaptation Strategy which utilises adaptive pathway thinking to guide its approach to climate change adaptation

Table 4-1 AMS - Activities and programs completed in 2019-20



	Growth plan.	Our growth plan is updated annually to reflect the latest connection growth information and development forecasts ensuring that developers, planners and the broader community can reference up-to-date information.
	Climate adjusted demand forecast.	Implementing the updated climate-adjusted demand forecasting to our demand modelling and projections.
	Borefields (groundwater source) management plan.	A comprehensive review of our borefields assets (groundwater source) was completed, and an asset management plan was developed. This plan includes various activities and preventive maintenance works required to be undertaken to ensure service requirements are able to be met.
	AMS internal audit.	The asset management planning program has been updated to include an implementation review, where Hunter Water checks the alignment between the asset management plans and the operation and maintenance schedules, and other implementation actions of the plan.
	Asset management plans.	Developed or reviewed asset management plans for our most critical assets, including dams, water treatment plants, and high voltage
Investment management	Strategic planning.	Continued implementation of the strategic cases and program business cases, including the use of Investment Logic Maps.
	Investment management.	Finalised our strategic cases and program business cases for the 2020-24 Price Path
	Standard technical specifications.	Continuous improvement of standard technical specifications for: SCADA and automation equipment, lifting equipment, pressure equipment, chemical storage and delivery systems, work as constructed information, drinking water quality pipeline installations and preparation of civil, structural and mechanical engineering drawings.
	Approved products.	Update the list of approved electrical and mechanical products within our asset portfolio.
Asset creation	Resource strategy.	Engagement of program and project management support.
	Asset Solutions.	The Asset Solutions Group continues to provide support capacity to deliver the capital investment portfolio and improve capability across the business.
	Capital portfolio.	Reviewed and prioritised our capital portfolio to meet our combined 2017+3 Strategy and asset management objectives.
	Asset renewal.	Reviewed and updated the forecast asset renewal investment to meet business objectives including the risk appetite statements

4.1.3 **Proposed asset management activities and programs**

We will continue to review and improve our AMS to meet defined asset management objectives. The AMS initiatives planned to be undertaken through 2020-21 include a combination of improved management system governance, processes and procedures. The key initiatives are described in Table 4-2.

AMS Initiative	Activity / Program	Results / Outcomes	Timetable
Asset management system	Asset management plans.	Continue development, rolling review, update and consolidation of our asset management plans including facility plans and asset class strategies, based on asset criticality and in accordance with Hunter Water's document control system.	Ongoing.
	Competency and training.	Develop asset management competency-based training modules to ensure that staff possess the	May 2021.

Table 4-2: AMS – proposed activities and programs



		various essential skills & competencies in each workplace environment ensuring high levels of customer service and work health safety.	
	Leadership.	Continue to implement and embed management review through planning & coordination of both the executive management review and asset management steering committee.	Ongoing.
	Document management system.	All necessary documents will be updated and captured through the new document control standard and system (Integrum). Documents will also have document control tables consistent with the Hunter Water document control standard.	Ongoing.
	Root cause analysis.	Review and revise the Incident Management Standard to ensure consistency for management of non-conformance reports.	May 2021
	Stakeholder & community engagement.	We are continuing to innovate in our approach to stakeholder, customer and community engagement, with a suite of initiatives. This includes the Love Water program. These initiatives are integrated into the AMS through asset planning/creation and managing operational community and customer impacts.	
	Asset standards.	Continuous improvement of standard technical specifications and design guidelines/codes.	Ongoing.
Asset Planning	Critical assets.	Review and update the Critical Asset Program incorporating the enterprise risk management framework and risk appetite statements for all asset classes.	Dec 2020.
	Growth Plan.	Continuous improvement of Hunter Water's Growth Plan with addition of dashboard tools.	Dec 2020
	Master planning framework for future growth areas.	A master planning framework will be finalised which incorporates opportunities from the Growth Plan and Integrated Water Management.	Dec 2020
	Water resilience program.	We are improving our planning for water security by expanding the planning philosophy to incorporate adaptive planning, scenario planning, systems thinking and opportunity thinking principles related to water conservation, integrated water cycle management and water source augmentations.	Ongoing.
	Sustainable wastewater.	We are expanding our traditional wastewater planning to consider medium and long term opportunities for potential waste to energy solutions, improved biosolids management, recycled water systems and carbon neutrality.	Ongoing.
Asset Information	Information standards & process.	A review of our asset information standards and collection processes is underway as part of continuous improvement.	Ongoing.



4.1.5 Significant changes to the Asset Management System in 2019-20

Hunter Water successfully completed an ISO 55001:2014 re-certification audit of our AMS during 2019-20.

There have been no significant changes to Hunter Water's AMS during 2019-20.

4.1.6 Non-conformances in the Asset Management System and planned actions to resolve

There were no major non-conformances with our AMS in 2019-20.

The 2020 recertification audit of our AMS identified minor non-conformances that have been incorporated as improvement initiatives through 2020-21. These include:

- Hunter Water will review the alignment of its asset management objectives with the appropriate risk and opportunity mitigation actions within asset management plans.
- The reporting process of AMS non-conformances will be reviewed to ensure alignment with the Integrated Management System (IMS). Asset criticality will be a key consideration in defining the approach for entry to the IMS and the applicable works management system.
- The content of the IMS management review will be updated to provide additional detail to reflect the requirements of the AMS.
- Ensure that testing of the Grahamstown Dam Safety Emergency Plan is practised as a classroom exercise every three years and a full practical test every five years. This is a recurrent activity within the applicable works management system.



4.2 Environmental Management System

Clause 4.2 of our Operating Licence states that Hunter Water must maintain and implement an Environmental Management System (EMS) that is consistent with the Australian Standard AS/NZ ISO 14001:2016 Environmental Management Systems – requirements with guidance for use.

Our EMS provides a framework for developing, implementing, monitoring and reviewing our objectives, actions and targets in relation to our commitment to the community and environment. We have been externally audited and certified against the ISO Standard, demonstrating our compliance with Clause 4.2 of our 2017-2022 Operating Licence.

4.2.1 Environmental Management Plan

The development and implementation of an Environmental Management Plan (EMP) is a key component of our EMS. The EMP outlines our environmental objectives, program of actions and targets to manage risk as well as drive environmental improvements for the organisation.

The EMP is reviewed and updated every two years. Our current 2018-2020 EMP was approved by our Board of Directors in February 2018.

The 2018-2020 EMP is publically available on our website and has 21 key environmental objectives. These objectives guide organisational improvement and address our key responsibilities to the environment and community. Against each objective are one or more actions/programs, and set targets/indicators. The environmental objectives have been categorised into one of four initiative categories, as outlined below:

- Water service initiatives.
- Wastewater service initiatives.
- Stormwater service initiatives.
- Business practice initiatives.

Hunter Water will finalise a new EMP in late 2020.

4.2.2 Environmental management activities and programs, 2019-20

The activities and programs undertaken in 2019-20, separated into the four initiative categories previously described, are outlined in Tables 4-3 to 4-6.

Water service initiatives

Table 4-3:	EMS - Activities and	programs com	pleted in 2019-20
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EMS Objective	Activity / Program	Results / Outcomes
1. Protection of drinking water catchments	Catchment management plan.	 Assessment of development applications for proposed activities in drinking water catchments and liaison with approval authorities to mitigate potential risks to water quality. Liaison with recreation groups on Grahamstown Dam to ensure risks to water quality are clearly understood and appropriately managed. Bolstered catchment surveillance and enforcement in response to an increase in unauthorised access and related impacts, in part due to the drought. Schools Engagement project in partnership with Hunter Local Land Services (HLLS), which provided continuity to the existing project where education was delivered to local schools to improve awareness of the water cycle and the need to protect catchments. Some community groups are also included in the program. Sustainable Agricultural Project in partnership with HLLS, which continued to engage with farmers in drinking water



		 catchments. This year the focus was on Hunter Water contributing funds to the HLLS incentives grant program, where interested farmers can apply for grant funding to deliver farm upgrades that meet specified criteria. Continuation of work on the Tillegra Riparian Improvement Project, which involves delivery of a five year program of works to establish a riparian buffer zone on a 24 km section of the Williams River. The main activity this year was weed management.
	Collection and assessment of water quality data.	- The first of a series of quarterly reports evaluating trends in per- and polyfluoroalkyl substances (PFAS) in source waters and treated water was completed in June 2020. A summarised version of this report was provided to, and discussed, with NSW Health at a liaison meeting in June 2020.
2. Sustainable use of water resources	Compliance with water supply works and water use approvals.	 Over the reporting period, we operated in accordance with the water access and environmental flow requirements of our Water Supply Works and Water Use Approval Licence. Actions to facilitate the continual improvement of compliance include: First variable speed vacuum station has been installed which reduces energy use by more accurately controlling extraction. The Tomago Borefields operational plan documentation was reviewed and improved. Implementation of electronic monitoring field software to increase efficiency of some licence monitoring. Implementation of a new aeration system for Chichester Dam to improve destratification efficacy and energy efficiency.
	Implementation of water efficiency programs.	 Details on the implementation of our water efficiency programs can be found in Hunter Water's annual Water Conservation Report.
	Lower Hunter Water Security Plan to define the long term strategy for water security and drought response.	 Continued work on the development of the second edition of the Lower Hunter Water Security Plan (LHWSP) which is on track to be completed in 2021. This work included preliminary investigations of water supply options including consideration of technical, environmental and social impacts. In addition, revised water conservation and recycled water strategies have been developed.
		- Implementation of a community engagement strategy continued to be rolled out. This included Phase 2 of the deliberative forums in June/July 2019. Also, community engagement activities were conducted throughout the year at community markets and agricultural shows as well as community drop-in sessions for two dam options and online engagement through a dedicated project website (YourVoice).
	Reductions in non- revenue water.	 Hunter Water has a program to reduce non-revenue water. It was reduced to 9.7 GL during 2019-20. This was an improvement of approximately 0.6 GL on the previous year. Activities included: Active leak detection work for over 6,500 kilometres of the water network Lining of the Four Mile Creek Reservoir. Optimisation of Grahamstown WTP to reduce water losses. Replacement of the Tarro to Duckenfield section of the CTGM. TaKaDu software expanded to cover 35% of the water network enabling events such as leaks and breaks to be detected. Active management and replacement of under reading large customer meters.
3. A reduction in environment and community	vvater asset plan for watermain breaks.	analysis of the impact of trunkmain failures and the works required to reduce its impact to the community. Significant



impacts from	funding (\$11M) has been committed for this work in this Price
watermain breaks	Path to reduce the impact of pipe burst.
	 Hunter Water has completed several studies (pipe burst modelling, risk assessment, pipe failure prediction review and flood modelling) to support a detailed business case, due by 31 December 2020.

Wastewater service initiatives

Table 4-4: EMS - Activities and programs completed in 2019-20

EMS Objective	Activity / Prog	ram Results / Outcomes
4. Undertake wastewater activities in a sustainable manner	Operate treatment plants in accordance with EPA licence requirements.	 Completed monitoring and reporting via annual returns and monthly website publishing. There was no adverse compliance or enforcement action undertaken by the regulator.
	Sustainable wastewater strategy.	 Following on from the development of a recycled water strategy in June 2019, the following initiatives have been undertaken: Development of recycled water portfolios to be assessed in the Lower Hunter Water Security Plan. Identifying and investigating recycled water opportunities for agriculture, urban irrigation, industrial and residential uses. Exploring drought response measures for recycled water. Working with customers, community and stakeholders to understand the value of recycled water in the urban environment. Development of economic tools for assessing the viability of urban irrigation and industrial recycled water schemes.
5. Reduce environmental and community impacts from wastewater overflows	Wet weather overflows reduction.	 Continued work on the Lake Macquarie Effects Based Assessment Program, with modelling undertaken by NSW Office of Environment and Heritage (now DPIE). This project is investigating the impacts on Lake Macquarie of wet weather wastewater discharges compared to impacts from stormwater inflows. The modelling work is due to be complete by August 2020. Funding for Asset Provision for 2020-2024 Price Path has been approved by Hunter Water's Board of Directors. This includes the provision for Wastewater Network Renewal, Wastewater Network Electrical and Mechanical Renewals and Network Fittings.
	Dry weather overflows reduction.	 Several actions were undertaken to ensure that we can minimise dry weather overflows to reduce the impact to the environment: A dry weather overflow supervisory control and data acquisition (SCADA) strategy has been developed to provide a broad outline of relevant actions Hunter Water will undertake to ensure that its SCADA system supports a reduction in the frequency and severity of dry weather overflows. A preventive maintenance trial has been completed with satisfactory results. It is planned to continue to do preventive jetting for a wider area. A dry weather overflow planning strategy is currently being prepared (draft is completed) and is due for completion by 31 December 2020.
	Wastewater Management Masterplan –	 Preliminary reporting of the outcomes of the Hunter River estuary model and early direction for the masterplan was submitted to the EPA in July 2019 in accordance with a Pollution Reduction Program requirement. The initial



	Hunter River Estuary Model.	 outcomes of the model indicate that wastewater treatment plants are a relatively minor contributor to average pollutant loads within the estuary, but they are significant contributor in tributaries. Progress on the masterplan has included: Establishment of community values, development of water quality thresholds, modelling of the boundaries of intervention, development of a long-list of options and an agreed assessment framework.
6. Monitor the health of our waterways and beaches	Beachwatch Program.	 Carried out sample collection and testing to provide input into the Beachwatch Program. Reviewed and provided input into the preparation of the annual Beachwatch report
7. Improved performance against environmental compliance obligations	Environmental Compliance Improvement Program.	Annual control plans are prepared to address areas of environmental risk that sit outside of the risk appetite thresholds which have been set by the Board. Good progress in completing actions was achieved during 2019-20 which included:
		 A strong focus on measures to reduce the fisks associated with chemical spills and dry weather overflows. There has also been a strong focus on capital delivery programs that will improve ongoing compliance requirements.
		 During the reporting period there were no incidents or events that resulted in EPA enforcement or penalties.
		 Compliance-related environmental training was delivered for staff.
8. A reduction in carbon	Renewable	The following actions were undertaken:
emissions from	energy from	 Organic waste market access investigation.
activities	wastewater.	 Continued consultation with industry stakeholders including technology providers, councils and other water authorities.
		- Continued sponsorship of a three year PhD project on zero
		emission sludge lagoons.
		 emission sludge lagoons. Commencement of development of a business case for centralised biosolids treatment with energy recovery.
		 emission sludge lagoons. Commencement of development of a business case for centralised biosolids treatment with energy recovery. Commencement of co-digestion trial at Cessnock WWTW (postponed due to Covid-19).
		 emission sludge lagoons. Commencement of development of a business case for centralised biosolids treatment with energy recovery. Commencement of co-digestion trial at Cessnock WWTW (postponed due to Covid-19). Sponsorship of a WSAA circular economy position paper.
	Renewable energy strategy.	 emission sludge lagoons. Commencement of development of a business case for centralised biosolids treatment with energy recovery. Commencement of co-digestion trial at Cessnock WWTW (postponed due to Covid-19). Sponsorship of a WSAA circular economy position paper. Hunter Water is investigating onsite roof and ground mount solar projects as a cost effective approach to delivering energy cost savings and carbon emissions savings.
	Renewable energy strategy.	 emission sludge lagoons. Commencement of development of a business case for centralised biosolids treatment with energy recovery. Commencement of co-digestion trial at Cessnock WWTW (postponed due to Covid-19). Sponsorship of a WSAA circular economy position paper. Hunter Water is investigating onsite roof and ground mount solar projects as a cost effective approach to delivering energy cost savings and carbon emissions savings. As part of the onsite renewable energy project, a 99.7kW solar PV trial project involving both roof and ground mounted systems was installed at Branxton WWTW with commissioning of the system scheduled in 2020-21.
	Renewable energy strategy.	 emission sludge lagoons. Commencement of development of a business case for centralised biosolids treatment with energy recovery. Commencement of co-digestion trial at Cessnock WWTW (postponed due to Covid-19). Sponsorship of a WSAA circular economy position paper. Hunter Water is investigating onsite roof and ground mount solar projects as a cost effective approach to delivering energy cost savings and carbon emissions savings. As part of the onsite renewable energy project, a 99.7kW solar PV trial project involving both roof and ground mounted systems was installed at Branxton WWTW with commissioning of the system scheduled in 2020-21. A project to rehabilitate an existing 110kW hydro generation system at Chichester Dam commenced in 2019-20 which is due to be commissioned in 2020-21.



Stormwater service initiatives

Table 4-5: EMS - Activities and programs completed in 2019-20

EMS Objective	Activity / Program	Results / Outcomes
9. Improved environmental outcomes from stormwater assets	Implementation of asset class stormwater management plans.	 Actions included: Development of stormwater map. Dumaresq Street culvert renewal completed. Stormwater critical main and stormwater condition assessment annual provisions allocated and spent on programmed work. Munibung Creek rehabilitation concept design commenced. Ongoing maintenance of stormwater assets including floating booms, silt traps, tidal gates, stormwater treatment devices and mowing. Development of new business cases for stormwater critical main, stormwater condition assessment and stormwater fencing annual provisions for the 2020-2024 period.
	Water sensitive urban design.	 Hunter Water investigated opportunities to supply recycled water for urban irrigation of sporting fields and parks, and investigating stormwater amenity improvements and naturalisation for existing concrete channels. A growth masterplan framework is being developed to allow integrated water management opportunities to be incorporated into future water and wastewater servicing solutions.
	Investigations into opportunities to naturalise stormwater assets.	 During 2019-20 the following works were completed to undertake amenity works around stormwater assets: Development of preliminary business case for stormwater amenity improvement program for the 2020-2024 period and presentation of information to IPART to support this new funding program. Lower Cottage Creek amenity works concept and detailed design completed. Ongoing updates as required to meet Newcastle Port community grant funding requirements Development of full business case for stormwater amenity improvement program for the 2020-2024 period.

Business practice initiatives

Table 4-6: EMS - Activities and programs completed in 2019-20

EMS Objective	Activity / Program	Results / Outcomes
10. The establishment of a work place culture that values sustainable work	Sustainability plan.	 A Sustainability Lead role was recruited to lead the strategic sustainability programme and develop the corporate sustainability strategy.
practices		 Development of an organisational sustainability framework commenced and a plan for the sustainability programme was developed.



		 Hunter Water signed the Hunter Region Collaboration Memorandum to participate in the Hunter Region Sustainable Development Goal Taskforce.
11. Improved environmental work practices	Implement continual improvements programs for the Environmental Management System (EMS).	 Completed two internal integrated audits for the EMS, WHS and quality management systems on the topic of treatment planning and treatment operations. The EMS was externally audited during the 2019 Operating Licence Audit and in June 2020 against AS/NZ ISO14001:2016.
12. Relevant community and stakeholder consultation on environmental matters	Informing the community about Hunter Water's activities and impacts on the environment.	 Ongoing consultation with the community and stakeholders when developing major projects including through our website and targeted consultation. We continued to use <i>Your Voice</i>, our community engagement platform (<u>www.yourvoice.hunterwater.com.au</u>), encouraging community participation in initiatives across our entire organisation.
	Love Water Campaign.	 The Love Water campaign underpinned the restrictions campaign launched in September 2019. Further details can be found in Hunter Water's annual Water Conservation Report.
	Awareness programs.	 Our schools engagement and broader community engagement activities continued to drive behaviour change at scale. More than 4,000 primary and pre-school students learned about water from our Bubbles and Squirt Water Saving Show which incorporates tips on how to 'love' water and where their water comes from. We attended numerous community events across our area of operations to advocate simple water saving tips and provide information on water restrictions. We have developed a new educational resource, Where's Our Water?' with local Indiagnous students and organisations.
	Community partnership programs.	 Our community partnerships are described in Chapter 5.
	Willingness to pay study - preparation for 2020 price path submission.	- In 2020, Hunter Water completed a survey of our customers to understand their preferences in relation to different aspects of Hunter Water's service. This survey included environmental services such as environmental sustainability and wastewater overflows.
	Hunter Water Regulation 2015.	- Hunter Water agreed with Department of Planning Industry and Environment (DPIE) for a deferral of 12 months for the remake of the Hunter Water Regulation 2015 (due for repeal on 1 September 2020 pursuant to the provisions of the <i>Subordinate Legislation Act (1989)</i> due to time and resourcing constraints. DPIE have confirmed they will defer the time for renewal/remake until September 2021.
13. Avoid environmental impacts and ensure the efficient use of resources	Environmental impact assessments and construction management.	- Environmental impact assessments were undertaken for the delivery of all new infrastructure. This includes construction contractors having construction environmental management plans for all relevant contracts.
	Waste avoidance and reduction.	- During 2019-20 waste data continues to be tracked and waste minimisation initiatives continue to be implemented. There was continued focus on spoil and resource recovery. An expert review was commissioned to identify further savings and environmental benefits in spoil management. There was a reduction in the amount of spoil generated from civil works and increased recycling of spoil achieved through increased soil testing analysis, review and better segregation. Waste was



		diverted from landfill through resource recovery of large skips from Hunter Water depots.
	Asset management activities.	 Hunter Water maintains an Asset Management System (AMS) consistent with ISO 55001. The AMS was recertified in June 2020. Further details on the AMS are provided in section 4.1.
14. Create a sustainable supply chain	A sustainable supply chain.	 Hunter Water has developed a sustainable procurement plan. Actions undertaken include: Review of procurement policy including incorporating sustainable procurement principles. Sustainable procurement training completed by staff in procurement and environment groups. Modern slavery gap analysis, supply chain risk profile based on potential risk and development of an action plan to start assessing and addressing modern slavery risks. Established a sustainable procurement working group.
15. Sustainable land management	Conservation of biodiversity value of operational land.	- Hunter Water has one biodiversity stewardship site at the Hunter Regional Botanic Gardens at Heatherbrae which was registered in May 2018.
	Management of land contamination.	 Key programs progressed during the reporting year have included: Monitoring of groundwater contamination at some of our wastewater treatment plants. Ongoing groundwater monitoring and assessment of sediments at Black Neds Bay at Swansea in response to a
		 chemical spill at a WWPS in 2013. Assessing tidal influences on groundwater contaminates at a former council landfill.
	Water quality in Tomago catchment.	 Hunter Water continued to work with the Williamtown Expert Panel on the use of firefighting foams in the Tomago catchment.
		- Hunter Water also continued to adhere to the PFAS Operating Strategy with the oversight of NSW Health. Hunter Water met with NSW Health every quarter and discussed the progress with the PFAS Operating Strategy. Details reported and discussed included individual bore operating rules, PFAS sampling undertaken and results, and proposed changes.
	Bushfire management.	Implementation of Hunter Water's Bushfire Management Plan continued during 2019-20. Actions undertaken include: - Updated Bushfire Management Plan 2020
		 Additional vegetation asset protection zone clearance at 25 critical sites; Bushfire resilience infrastructure improvements to 15 critical sites; Continued development of Geographic Information Systems (GIS) layers for Bushfire Management, a geospatial repository
		 of Hunter Water's bushfire related information. Development of Strategic Fire Management Plans for Grahamstown and Tomago Drinking Water Catchments, that will guide when, where and how Hunter Water should perform hazard reduction burns over the coming years.
	Weed management.	 Weed management programs have been implemented at Stockton, Grahamstown and along Crawchie Creek, which is located at the back of the Shortland WWTW. Weed management has continued for the Tillegra Riparian Improvement Project. Hunter Water has been actively involved in the Regional
		Weeds Committee, which has been looking at the best way to



			ensure that the requirements of the Biosecurity Act 2015 are fulfilled.
16. Reduce water consumption, wastewater generation and stormwater impacts	Water Cycle Management Plan.	-	Hunter Water engaged with its largest customers in the development of water efficiency management plans as part of the drought response. A number of potential recycled water schemes and stormwater harvesting opportunities have also been identified with the aim to achieve potable water savings, reduced effluent discharges and improved liveability outcomes
17. Effective contingency planning and management of environmental emergencies	Pollution Incident Response Management Plans.	-	In accordance with requirements of the Protection of the Environment Operations Act, Hunter Water has prepared 17 specific Pollution Incident Response Management Plans which cover each of our systems and assets included in each of our EPA Environment Protection Licences. The plans are updated every 12 months and reviewed after a pollution incident.
	Environmental incident investigations.	-	We formally investigated (including root cause analysis) two environmental incidents in 2019-20. Actions have been logged with responsible areas of the business. Progress will be tracked and reported until the actions are closed out.
	Hazardous chemical management.	-	The interim hazardous chemical improvement project that was completed in 2018-19 has meant in 2019-20 that there is a reduced risk of a hazardous chemical spill from Hunter Water chemical storage facilities. This included improvements to hazardous chemical areas at plants such as Grahamstown WTP, Cessnock WWTW, Raymond Terrace WWTW and Kurri Kurri WWTW.
18. Conserve cultural heritage	Conservation of cultural heritage.	-	Hunter Water reviewed moveable heritage management Heritage training for staff was undertaken.
19. To be climate resilient	Climate Change Adaptation Strategy.	-	During 2019-20 our climate change adaptation strategy was reviewed. As a result the strategy was updated and redeveloped. The adaptation strategy was endorsed by the Hunter Water Board in November 2019.
20. To reduce greenhouse gas emissions	Carbon reduction studies.	-	Hunter Water commenced development of a carbon strategy that will identify emissions reduction pathway options. The strategy will incorporate the existing investigations into renewable energy generation from wastewater as well as roof and ground solar projects.
		-	A number of other renewable energy projects were implemented during the reporting period, as was a fleet emission transition plan and the Smart Integrated Pumping System (to 75% of full scope). An investigation into the energy procurement options for purchased renewable energy and/or Large Scale Generation
	Energy monitoring and reporting framework.	-	Certificates (LGCs) also commenced. Hunter Water measures and verifies energy savings (both financial and GWh) quarterly, to track performance of energy efficiency projects each month. During the reporting year the Energy Management System moved to a new online platform which will include automation of the measurement and verification process calculations.
21. Improve environmental performance through the acquisition of applied knowledge	Research and development.	-	Continued implementation of the 2018 R&D Strategy principles and tools for prioritising R&D and maximising value. It seeks to align R&D projects with priorities, leveraging of funding and knowledge, and maximising the values of research to the organisation.



4.2.3 **Proposed environmental management activities and programs**

Hunter Water will continue to review and improve our EMS to meet its defined management objectives. The EMS initiatives planned to be undertaken through 2020-21, separated by initiative category, are outlined in Tables 4-7 to 4-10.

Water service initiatives

Table 4-7: EMS – Proposed activities and programs

EMS Objective	Activity / Program	Results / Outcomes	Timetable
1. Protection of drinking water	Catchment Management Plan.	- Review of the CMP in consultation with key stakeholders.	2020-21.
catchments		 Evaluation of possible actions to manage erosion in the Seaham weir pool. 	2020-21.
		 Continuation of the current Schools Engagement and Sustainable Agricultural projects. 	
			2020-21.
1. Protection of drinking water catchments	Collection and assessment of water quality data.	 The water quality monitoring program in the Williams River will be repeated. The program is aimed at evaluating water quality after completion of catchment improvement projects. 	2020-21 or 2021-22.
		- Analysis of long term trends in water quality for a broad suite of parameters will be completed for the Chichester and Grahamstown catchments.	June 2021.
2. Sustainable use of water resources	Compliance with water supply works and water use approvals.	We continue to plan for continuous improvements in our systems supporting the management of, notification and reporting on data collected for water management licence compliance. The following is planned:	2020-21.
		 Hydro-generator upgrade at Chichester to be variable speed to more easily match inflow. 	
		 Trial of aerial technology to monitor algal blooms in Grahamstown Dam. 	
		 Develop and update the water licence checklist to improve visibility of the licence. 	
	Implementation of water efficiency programs.	 Details on the implementation of our water efficiency programs can be found in Hunter Water's annual Water Conservation Report. 	
	Lower Hunter Water Security Plan to define the long term	Work will continue on the LHWSP and build on the technical options work largely completed in 2019-20. Actions moving forward include:	2021.
	strategy for water security and drought response.	 Development of portfolios, or groups of options, using a decision support framework. Preferred portfolios will be reviewed and approved through Hunter Water's Board and the LHWSP Governance Structure. 	
		- Hunter Water will undertake further community engagement on the portfolios through a third phase of deliberative forums as well as ongoing engagement through our Community Liaison Group, external engagement activities, and the YourVoice page on the Hunter Water website.	
	Reductions in non- revenue water.	- The delivery of initiatives will include active leak detection, development of customer meter replacement strategy, calibration of large bulk flow meters, implementation of water loss reduction strategy, and implementation of recycled water upgrades at various wastewater treatment plants.	Ongoing.



3. A reduction in environment and community impacts from watermain	Water asset plan for watermain breaks.	-	A business case will be developed in 2020 to reduce main breaks across the water network. Delivery of this program is expected to reduce water loss from breaks.	December 2020.
breaks		-	Ongoing monitoring and research.	2020-21.

Wastewater service initiatives

Table 4-8: EMS –	Proposed	activities a	nd programs
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EMS Objective	Activity / Program	Results / Outcomes	Timetable
4. Undertake wastewater activities in a sustainable manner	Operate treatment plants in accordance with EPA licence requirements.	 Continue to operate treatment plants in accordance with EPA licence requirements. Upgrades to multiple treatment plants are occurring to provide capacity and improved effluent quality to meet EPA requirements. Continue to monitor and report performance of treatment plants via annual returns and monthly website publishing. 	Ongoing.
	Sustainable wastewater strategy.	 Development of additional tools to support identification and evaluation of water recycling opportunities. Work with partners and stakeholders to assess the viability of recycled water schemes. Continue to explore opportunities for new recycled water schemes or the expansion of existing schemes. Work with customers, community, stakeholders and government agencies to continue to understand the value of recycled water in the urban environment and identify recycling opportunities 	Ongoing.
5. Reduce environmental and community impacts from wastewater overflows	Wet weather overflows reduction.	 Development of an inflow/infiltration reduction strategy for the Dungog wastewater system is soon to be formalised. A draft plan has been developed and Stage 2 is being implemented. This program of work is expected to be rolled out over the next 2 years. Development of an overarching wet weather overflow abatement strategy. Hunter Water will develop a strategy to improve wet weather system performance for the Lake Macquarie wastewater system based on the outcomes of DPIE modelling and consultation with key stakeholders over the next 12 months. This will be followed by the development of a plan which will describe how the targets identified in the strategy will be achieved. A Wastewater Pump Station Strategy and Rising Main Renewal Strategy are currently being prepared and will still continue to progress in the next 12 months. 	2020-21 and 2021-22.
	Dry weather overflows reduction.	 Hunter Water will continue to work on the dry weather overflow SCADA strategy 	Ongoing.



		-	actions to ensure SCADA supports a reduction in the frequency and severity of dry weather overflow. The dry weather overflow planning strategy has been progressed and expected to be	
			finalised by 31 December 2020.	
	Wastewater Management Masterplan – Hunter River Estuary Model.	-	Develop and finalise the Hunter River Estuary wastewater masterplan during 2020-21. The masterplan will explore nutrient offsets, infrastructure upgrades, and reuse schemes.	2020-21.
		-	Combinations of options will be evaluated through an effects-based framework, a resilience framework and an economic assessment. Stakeholders will be engaged to provide feedback and to align goals for potential future collaboration to enable better outcomes for the estuary.	
6. Monitor the health of our waterways and beaches	Beachwatch Program.	-	Involvement in the Beachwatch program will continue in the future. We plan to review our current sample collection and testing schedule to ensure the program continues to be fit for purpose in matching program requirements.	Ongoing.
7. Improved performance against environmental	Environmental Compliance Improvement Program.	-	Prepare annual control plans to address areas of environmental risk that sit outside of the risk appetite thresholds which have been set by the Board of Directors.	2020-21.
compliance obligations		-	Implementation of the capital program and strong focus on improving operational compliance will continue.	
8. A reduction in carbon emissions from wastewater treatment activities	Renewable energy from wastewater.	-	Work will continue regarding the completion of the business case for renewable energy from biosolids.	June 2021.
	Renewable energy strategy.	The ren	ewable energy strategy includes:	
		-	Commissioning of 99.7kW solar system at Branxton WWTW trial site.	2020-21.
		-	hydro generation at Chichester Dam.	2020-21.
		-	Procurement and construction of Stage 1 of the Onsite Renewable Energy Project (up to 1.4MW) and procurement of Stage 2 of the project. Delivery of subsequent Stages as deemed feasible.	Over the next two to three years.
		-	Ongoing investigation of floating solar Photo Voltaic opportunities with the intention of constructing a trial project in 2021-22.	Ongoing.
		-	Investigation of battery storage potential to augment the Onsite Renewable Energy Project and other energy efficiency, demand response, and electricity procurement initiatives.	Ongoing.



Stormwater service initiatives

Table 4-9: EMS – proposed activities and programs

EMS Objective	Activity / Program	Results / Outcomes	Timetable
9. Improved environmental	Implementation of asset class	 Hunter Water will roll out the works identified under the new business case programs. 	Ongoing.
outcomes from stormwater assets	stormwater management plans.	 Hunter Water will continue to work on the design of the Munibung Creek rehabilitation in order to proceed with construction by late 2021. 	2021-22.
	Water sensitive urban design.	 Development of programs of work for recycled water for urban irrigation and stormwater amenity improvements, for delivery over the next four years. 	Ongoing (over the next four years).
		 Completion of the growth servicing Masterplan framework, incorporating integrated water management. 	
	Investigations into opportunities to	 Hunter Water will roll out the works under the Stormwater Amenity Improvement Program. 	Ongoing.
	naturalise stormwater assets.	- The construction of the Lower Cottage Creek Amenity Works will be finalised by June 2021.	June 2021.

Business practice initiatives

Table 4-10: EMS –	Proposed activities a	ind programs	
EMS Objective	Activity / Program	Results / Outcomes	Timetable
10. The establishment of a work place culture that values sustainable work practices	Sustainability plan.	 Implementation of the organisational approach to sustainability will commence and organisational sustainability priorities will be confirmed with input from external engagement. 	2020-21.
11. Improved environmental work practices	Implement continual improvements programs for the Environmental Management System (EMS).	- The existing internal audit program will be reviewed in 2020 to ensure appropriate auditing coverage across the business continues but at least three management system audits are planned over the next twelve months.	2020-21.
12. Relevant community and stakeholder consultation on environmental matters	Informing the community about Hunter Water's activities and impacts on the environment.	 We will continue to consult with the community and stakeholders when developing major projects including through our website and targeted consultation. We will also continue to use Your Voice, our community engagement platform (www.yourvoice.hunterwater.com.au) encouraging community participation in initiatives across our entire organisation. 	2020-21.
	Love Water Campaign.	 Over the 2020-21 reporting period, we will continue to promote the messages of the Love Water campaign. We plan to reach more of our community with our Love Water messaging. This will be achieved by utilising additional advertising mediums such as billboards, shopping centres, murals on Hunter Water assets and signage upgrades. 	2020-21.
	Awareness programs.	 We will continue to focus on residential water efficiency projects, schools education and awareness programs. We plan to expand this to 	Ongoing.

include non-residential customers to improve



		-	their education about these initiatives and drive behaviour change. We will continue to build relationships with Aboriginal and Torres Strait Islander peoples and organisations, environmental groups, young people and the business and development community to seek their views and advocate for water conservation. We are developing a new early education water saving show to better reflect our vision for water conservation education. We are also developing more digital resources to support teachers and students in learning about sustainability.	2020.21
	Willingness to pay study - preparation for 2020 price path submission.	-	A second phase of service levels engagement work in 2020-21 will involve a willingness to pay study to understand customer's preferred service levels for Hunter Water.	2020-21.
	Hunter Water Regulation 2015.	-	Actions in 2020-21 will include engagement with internal and external stakeholders, engagement of an external consultant to prepare the required Regulatory Impact Statement in accordance with the Better Regulation Principles, liaison with the Portfolio Minister with respect to proposed changes, and public exhibition of changes and consideration of public submissions.	2020-21.
13. Avoid environmental impacts and ensure the efficient use of resources	Environmental impact assessments and construction management.	-	Hunter Water will continue to undertake environmental impact assessments for the delivery of all new infrastructure	Ongoing.
	Waste avoidance and reduction.	-	Review and implement a Spoil Improvement Plan including applying for a Resource Recovery Order and Exemption with the NSW EPA to increase spoil re-use within Hunter Water operations.	2020-21.
		-	A review of all current waste contracts will be undertaken to include opportunities to improve resource recovery, waste handling and diverting waste and recycling from landfill. Staff and contractors will be engaged on waste and recycling	
	Asset management activities.	-	Maintain ISO 55001 certification status. Ensure continuous improvement by reviewing and progressing actions from audit report findings and recommendations.	Ongoing.
14. Create a sustainable supply chain	A sustainable supply chain.	Prop -	osed actions include: Hunter Water's first Modern Slavery Statement will be produced by December 2020	2020-21.
		-	Development of a Hunter Water Supplier Partnership Principles document which will be shared with our suppliers.	
		-	Review and revise key performance targets for sustainable procurement. Review procurement social memberships (NSW	
		-	Indigenous Chamber of Commerce and Social Traders). Continue to engage and have input into the	
15. Sustainable	Management of land	-	Hunter Water Sustainability Framework. Contamination assessments and monitoring will continue	2020-21.
and management				



	Water quality in Tomago catchment.	-	Hunter Water will continue to adhere to the PFAS Operating Strategy with the oversight of NSW Health.	2020-21.
	Bushfire management.	-	Hunter Water will implement Strategic Fire Management Plans. Develop and commission remaining plans for Hunter Water Catchments and large land holdings.	2020-21 and 2021- 22.
		-	Hunter Water will also develop a map of named and signposted fire trails through Hunter Water freehold lands, and begin upgrading the fire trails accordingly. Ongoing development of Geographic Information Systems (GIS) layers for Bushfire Management will continue.	
		-	Further Bushfire Threat Assessment inspections of assets on the critical asset register will be conducted and actions prioritised to ensure that ongoing vegetation management and infrastructure resilience is improved.	
		-	Hunter Water will continue to liaise with the RFS and Bushfire Management Committees, and ensure Hunter Water's bushfire risk reduction activities are included in their Bushfire Risk Management Planning.	
	Weed management.	-	The weed management programs commenced in 2019-20 and will continue with additional sites included that target priority weeds.	2020-21.
16. Reduce water consumption, wastewater generation and stormwater impacts	Water Cycle Management Plan.	-	Stakeholder engagement will continue, such as with councils via the interagency working group. Further option development for the most feasible recycled water and stormwater harvesting opportunities will be undertaken.	2020-21.
17. Effective contingency planning and management of environmental	Pollution Incident Response Management Plans.	-	Update the plans and review in the event of a pollution incident.	2020-21.
	Environmental incident investigations.	-	Progress will be tracked and reported until actions are closed out.	Ongoing.
	Hazardous chemical management.	-	Hunter Water will continue to implement upgrades to chemical dosing facilities and chemical storage facilities at treatment plants.	Ongoing.
18. Conserve cultural heritage	Conservation of cultural heritage.	-	We will continue to review management of moveable heritage and maintain our Section 170 Heritage Register.	2020-21.
19. To be climate resilient	Climate Change Adaptation Strategy.	-	The adaptation strategy will be further developed through an implementation plan over the next 12 to 24 months.	2020-21 and 2021- 22.
20. To reduce greenhouse gas emissions	Carbon reduction studies.	-	Development of the carbon strategy will continue in 2020-21, in coordination with the energy strategy, with the first iteration to be considered by the end of 2021.	2020-21 and 2021- 22.
		-	Work will be undertaken to refine estimates of Hunter Water's scope 3 carbon emissions.	
	Energy monitoring and reporting framework.	-	Continuation of existing measurement and verification of energy savings.	Ongoing.



21. Improve environmental performance through the acquisition of applied knowledge

Research and development.

The R&D program priorities will be reviewed annually.

2020-21.

4.2.4 Significant changes to the Environmental Management System in 2019-20

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There were no significant changes to the EMS in 2019-20.

4.2.5 Major non-conformances with the Environmental Management System in 2019-20

No major non-conformances with the EMS were identified during third party certification audits or internal audits during 2019-20.



4.3 Quality Management System

This section describes Hunter Water's quality management performance. It reports on compliance with clause 4.3 of our Operating Licence¹⁴ and details the quality management programs and activities completed during 2019-20 as well as the results and outcomes of these activities. Furthermore, it reports on the proposed programs and activities for 2020-21. This section also reports on any non-conformances with, and significant changes made to, our Quality Management System (QMS).

4.3.1 Overview of Hunter Water's Quality Management System

Hunter Water's Quality Policy Statement commits the business to maintaining high levels of customer and community satisfaction through consistently providing safe, reliable and efficient services.

To put this statement into practice, Hunter Water has implemented and maintains a QMS. The system consists of systematic processes to manage the core functions of the organisation and is implemented to ensure the organisation consistently meets all of its product and service requirements, addresses its risks and opportunities and provides high levels of customer satisfaction while meeting regulatory requirements.

We have adopted an integrated approach to operating our management systems in the form of an Integrated Management System (IMS). The IMS provides processes, principles and guidelines across common functions of the different management systems. Individual management systems provide the subject matter expertise and inputs to the integrated processes. Elements of the ISO 9001 quality requirements are managed via the integrated processes, systems and data in Hunter Water's IMS and others are managed directly via the QMS.

We achieved initial certification to ISO 9001 in August 2015. We have continuously maintained our certification and passed our most recent, external, annual surveillance audit (June 2020). During the June 2020 audit all ISO Management Systems were recertified to ensure recertification dates align and improve efficiency. These standards include ISO 9001 Quality, ISO 14001 Environment, 27001 IT Security, 45001 Health and Safety and ISO 55001 Asset Management.

As a result of the integrated approach, only quality-specific requirements are managed directly by the QMS. In addition, the requirements of the Australian Drinking Water Guidelines (ADWG) and Australian Guidelines for Water Recycling (AGWR) form two of the many requirements that we must comply with in providing our products and services. So, whilst they can be described in isolation, in practice they form part of the overall QMS for Hunter Water. The ADWG and AGWR are described in detail in Chapter 2 of this report.

The objectives of our IMS and QMS are:

- Reliable, high quality water and wastewater service delivery.
- Customer satisfaction.
- Compliance.
- Continuous improvement.
- Meet stakeholder needs.

¹⁴ NSW Government 2017, Hunter Water Operating Licence 2017-2022, clause 4.3.



Figure 4-1: Overview of our Integrated Management System and the applicable sections of the compliance and performance report





4.3.2 Quality management activities and programs, 2019-20

Activities and programs completed in 2019-20 to meet the objectives of the QMS/IMS are described in Table 4-11.

Objectives	Activity / Program	Results / Outcomes
IMS		
Continuous improvement	Develop a business plan for implementation of an integrated incident and risk management application, Watershed, to capture and manage governance, risk, compliance and incident information.	The business plan for this system has been undertaken with the Watershed project incorporated into the Go Digital work program for 2020-24. The project is currently going through the normal review and approval process applied to major investment decisions.
	Review and improve Hunter Water audit processes.	There is a constant process of reviewing and documenting the internal management system. This includes audit processes, determining the audit program and adopting a triennial audit program.
Compliance	Document key processes and data input requirements to ensure correct information management for the Watershed management project.	Business and solution requirements have been documented as necessary to ensure that a quality product is acquired.
QMS		
Continuous improvement	Formalising and improving operational performance through improved quality monitoring processes.	The Drinking Water Quality Management System has been updated to strengthen key operational settings for disinfection.
	Quality non-conformance program.	Our quality non-conformance processes are being enhanced to ensure a continual improvement of the QMS.
	Review of resourcing plan.	Our resourcing plan and how we support the system was reviewed. This led to an increase in resourcing, specifically Hunter Water has employed an Integrated Systems Manager as of June 2020 to ensure that there is monitoring and continual improvement of our management systems.
Meet stakeholder needs	Customer engagement programs.	Our call centre is the primary contact channel for customers, receiving over 135,000 incoming calls per year and delivering a variety of functions and services. We also provide face-to-face service to customers via the front-counter customer service team. This team receives applications, answers customer enquiries, processes payments and updates data in our system (e.g. customer details). Customer experience monitoring shows that our customers are highly satisfied with the performance of the contact centre and that Hunter Water is easy to do business with.
		using a supported and sophisticated platform. This was necessary as the old platform was aged and unsupported. As a result, this limited our ability to make fundamental changes to improve usability and overall customer experience. The design of the new website was centred on best practice research and insights from our customers and community (e.g. removal of friction points).
Compliance	Reporting and monitoring protocol.	We have created a reporting and monitoring protocol to document our reporting against Operating Licence system performance standards.

Table 4-11: IMS/QMS - activities and programs completed in 2019-20



4.3.3 **Proposed IMS and QMS activities and programs**

Hunter Water works to progressively develop and improve the IMS / QMS. Future proposed activities and programs to meet the objectives of the QMS/IMS are described in Table 4-12.

QMS / IMS Objectives	Activity / Program	Results / Outcomes	Timetable
Continuous improvement	Customer engagement – Service and experience program. Further enhancement of the new website. Continuation of the "your voice" program, schools program, community forums, the love water campaign and other similar activities.	We will continue to listen to our customers to properly understand their needs and expectations.	Ongoing.
	Progressive delivery of the Go Digital ICT project.	Implementation of Watershed to enable an enterprise wide management of areas such as risks, incidents and audit activities.	January 2022.
	New billing system.	To reduce the risk of the existing system not performing as required as it approaches the end of its predicted life span. Standardise business process and reduce existing maintenance costs associated with the current system. Improve data management and promote faster billing processes.	November 2020.
Meeting stakeholder needs	Mystery Shopper and customer experience monitoring.	Continue with Mystery Shopper activities and customer experience monitoring to ensure are customers are highly satisfied and that Hunter Water is easy to engage with.	Ongoing.
Compliance	On-going relationship with Internal Management System Audit Provider.	To enable continuous monitoring, review and improvement of management systems.	Ongoing.

Table 4-12: IMS/QMS - Proposed quality management activities and programs

4.3.4 Significant changes to the Quality Management System in 2019-20

There have been no significant changes made to the QMS during 2019-20.

4.3.5 Major non-conformances with the Quality Management System

There have been no major non-conformances with the QMS during 2019-20. Our external management system provider, Bureau Veritas, has completed a recertification audit across all of our management systems. We are addressing all identified minor non-conformance issues, observations and opportunities for improvement.



5 CUSTOMER AND STAKEHOLDER RELATIONS

This chapter describes the activities and achievements of our Customer and Community Advisory Group during 2019-20 and demonstrates our compliance with the Group's charter.

This chapter also identifies underlying complaint drivers and describes the actions taken to resolve complaints.

Any changes to the following are also outlined:

- Customer contract.
- Procedures for payment difficulties and actions of non-payment.
- Charter for the Customer and Community Advisory Group.
- Internal complaints handling procedures.
- External dispute resolution scheme.

5.1 Customer and Community Advisory Group

Our Operating Licence¹⁵ requires that we maintain and regularly consult with our customers through a customer advisory group. Our Customer and Community Advisory Group (CCAG) fulfils this purpose.

5.1.1 Compliance with the Customer and Community Advisory Group charter

Our compliance with the CCAG Charter is demonstrated in Table 5-1.

Table 5-1 Compliance with the requirements of our Customer and Community Advisory Group's Charter in 2019-20

	Charter requirement	Compliance
ection 2 – Role of ne Customer and community dvisory Group.	Section 2.1, 2.2 and 2.3 - To provide advice on the interests of customers and consumers of Hunter Water, the Customer Contract and other key issues related to Hunter Water's planning an operations.	Compliance with the requirements of this section is demonstrated by the range of topics discussed at CCAG during 2019-20. Minutes for all meetings (including actions taken by Hunter Water) are available at: <u>https://yourvoice.hunterwater.com.a</u> <u>u/ccag</u>
Section 3 – How members and the Chair of the Customer and Community Advisory Group will be appointed.	A person representing each of the groups nominated in section 3.1 are included on the forum where practicable.	Hunter Water has promoted applications to the CCAG via recruitment advertisements on its website and social media.
	The requirements of members are outlined in Section 3.2. The selection process is outlined in Section 3.3 and 3.4. Section 3.5 addresses membership	Historically, Hunter Water has had difficulty recruiting members to represent the 'Indigenous Australian' membership category.
	vacancies.	Alongside the implementation of its Reconciliation Action Plan (RAP) in 2020, Hunter Water undertook targeted advertising of the CCAG to broaden the diversity of the Group's
	ection 2 – Role of e Customer and ommunity dvisory Group.	Arter requirementaction 2 – Role of e Customer and ommunity dvisory Group.Section 2.1, 2.2 and 2.3 - To provide advice on the interests of customers and consumers of Hunter Water, the Customer Contract and other key issues related to Hunter Water's planning an operations.action 3 – How embers and the nair of the ustomer and ommunity dvisory Group will e appointed.A person representing each of the groups nominated in section 3.1 are included on the forum where practicable.The requirements of members are outlined in Section 3.2. The selection process is outlined in Section 3.3 and 3.4. Section 3.5 addresses membership vacancies.

¹⁵ NSW Government 2017, Hunter Water Operating Licence 2017-2022.



Mandatory content	Charter reference	Charter requirement	Compliance
			membership. As a result of this targeted approach, two applications were received from members of the local Aboriginal and Torres Strait Islander community. These members were formally appointed to the CCAG in August 2020.
Membership term	Section 4 – the term for which members are appointed.	Section 4 provides for four year terms, with allowance for one renewal.	All members have term limits.
Operations	Section 5 – Operations	Section 5.1 - meetings will be held at least four times per year.	Five meetings were held in 2019- 20, in August 2019, October 2019, November 2019, March 2020 and May 2020. The October 2019 meeting was held with Hunter Water's Board of Directors.
			The meetings were held in different locations across Hunter Water's area of operations. Due to COVID-19 social distancing, the May 2020 meeting was held online via Zoom.
		Section 5.2 – Chairperson – Hunter Water will appoint an Independent Chair.	In 2019-20, Hunter Water extended the term of the Group's chair by 12 months. Councillor Le Mottee's term was to expire in September 2020 (to coincide with the conclusion of his current term as a Port Stephens Councillor). Consistent with the extension in local government terms due to COVID-19, Hunter Water extended his term as CCAG Chair by 12 months.
		Section 5.3 – Attendance at meetings.	The invite list to CCAG meetings is restricted to CCAG members, Hunter Water staff and invited guests.
		Section 5.4 – Quorum.	All meetings held in 2019-20 satisfied the quorum requirement
		Section 5.5 – Meeting papers.	CCAG members are provided with meeting notice in advance of meetings, which includes the opportunity to help shape the meeting agenda. Meeting papers were then distributed in advance of each meetings.
		Section 5.6 – Authority.	The CCAG acted as an advisory committee for the full year.
		Section 5.7 – Conflict of Interests.	A standing item on each CCAG agenda is an opportunity to declare conflicts of interest. Any



Mandatory content	Charter reference	Charter requirement	Compliance
			declarations made are recorded in the minutes.
		Section 5.8 – Sub- committees/working parties.	Nil working parties/sub committees were formed or held in 2019-20.
Procedures for monitoring issues raised at meetings	Section 6 – Monitoring and reporting on issues raised at the Customer and Community Advisory Group.	Section 6.1 – Minutes – requires Hunter Water to maintain minutes of each meeting.	Minutes of each meeting are recorded, and tabled for adoption at the next meeting of the CCAG. Adopted minutes are published on the CCAG website. Minutes for all CCAG meetings held during 2019-20 are available on the CCAG website.
Types of matters raised and mechanisms.	Section 7 – Matters to be considered by the Customer and Community Advisory Group.	Hunter Water will liaise with members to assemble the agenda and distribute in advance of meetings. Matters include: Performance objectives, consultation strategies, programs and activities, current and emerging issues.	Members are invited to submit items for the agenda, both in the form of substantive topics for inclusion and Questions on Notice. CCAG Members are also able to raise any topics (without notice) during General Business. Questions are documented in the Minutes, and actions recorded. Key matters raised in 2019-20 are described in Section 5.1.2, below.
Communicating meeting outcomes	Section 8 – Communicating the outcomes of the Customer and Community Advisory Group to the Public.	Section 8.1 outlines Hunter Water's reporting responsibilities including publication of adopted meeting minutes will be published on Hunter Water's website. A summary of the Forum's work will be included in Hunter Water's Annual Report. Forum activities are to be included in newsletters to Hunter Water employees.	Meeting minutes are available on Hunter Water's website. (see <u>https://yourvoice.hunterwater.com.a</u> <u>u/ccag</u>) A summary of meetings will also be included in Hunter Water's 2019-20 Annual Report. Updates on the Group were included in the employee newsletters.
Procedures for amending the charter	Section 10 – Charter. Section 11 – Approvals.	Section 10.1 – The CCAG's charter will be updated at least once every four years. The Charter is to be approved by Hunter Water's Board of Directors.	Hunter Water commenced a review of the CCAG in February 2018. We engaged the University of Technology Sydney to undertake a strategic review session with members. In May 2018 the CCAG adopted a series of recommendations from the strategic review to improve CCAG operations, including a commitment to refresh the Group's Charter. In August 2018 Hunter Water presented a draft updated Charter to the CCAG. This was endorsed by members and subsequently approved by Hunter Water's Board of Directors. The new Charter is a living document, and is required to be reviewed by no later than September 2022.


Mandatory content	Charter reference	Charter requirement	Compliance
Funding and resourcing	Section 9 – Funding and resourcing of Customer and Community Advisory Group.	Hunter Water will provide a venue and secretarial support for the CCAG.	Hunter Water ensured appropriate venue and secretarial support was provided for each meeting.
		Members of the CCAG are paid a sitting fee consistent with the Premier's Memorandum (M2012-18 Classification and Remuneration Framework for NSW Government Boards and Committees).	All CCAG members were provided with an option to collect the sitting fee for each meeting they attended in 2019-20. These fees were paid into the bank accounts nominated by members, or where nominated, paid to their organisation or a charity of their choice.
		Hunter Water will reimburse members reasonable out of pocket expenses.	Nil costs were reimbursed during 2019-20, however this option remains available to members if required.

Source: Hunter Water's 2017-2022 Operating Licence, CCAG Charter. Hunter Water analysis

5.1.2 Customer and Community Advisory Group activities and achievements 2019-20

The CCAG considered a range of issues in 2019-20, including those recommended by Hunter Water, and selfgenerated topics that were of interest to members of the group.

In accordance with the Charter, matters were raised either for information or to receive feedback from members. It should be noted that the matters outlined in the following sections were relevant to the time they were raised, however further progress and/or changes may have resulted since that time.

Key matters and achievements in 2019-20

Hunter Water's strategic direction (including corporate performance)

At each meeting as part of the Managing Director/Acting CEO's report, Hunter Water provided an update on corporate performance, including against the 2017+3 Strategic Direction, and quarterly Corporate Scorecard results. Performance against the National Performance Report indicators was also considered and reported.

In October 2019 an extraordinary meeting of the CCAG was held to coincide with a meeting of Hunter Water's Board of Directors. The session allowed for discussion between the groups on Hunter Water's drought customer communications.

Drought

At each meeting Hunter Water provided an update on current water storage levels, and drought impacts, both within its area of operations and across the broader region. This included discussion about the integrated 'Love Water' water conservation campaign, Water Restrictions (both Level 1 and Level 2), support for business and residential customers, the role of Community Water Officers, drought tankering program with local councils and providing water donations to the broader Hunter community.

Lower Hunter Water Security Plan

Hunter Water presented an update on the Lower Hunter Water Security Plan at each meeting, including customer and community engagement processes and results, and phased investigations. In August 2019, this included a presentation on the paleochannel, and interregional transfers (including the operation of the Central Coast pipeline). In November 2019, a discussion was held on the role of new technology both for water conservation, demand management, and source augmentation. In March 2020, Hunter Water presented on



the importance of water conservation as part of all portfolios. In May 2020, a discussion was held on recycled water opportunities across the Lower Hunter.

Hunter Water's price submission

Hunter Water submitted its pricing proposal (price submission) to IPART on 30 June 2019. Throughout the proposal's development, and during its consideration by IPART, Hunter Water provided updates to the CCAG. This included information on the pricing process itself, key issues and the proposed community engagement approach (including the formal engagement exercises to be undertaken by IPART after the proposal is lodged). Members participated in the public review process, including attending hearings and making submissions to IPART.

Approach to digital servicing and experience

In November 2019, CCAG members participated in a briefing about Hunter Water's digital transformation, including customer focused work to improve service and operational performance. A presentation was provided on changing service delivery models and expectations, the opportunities provided by the Internet of Things (IoT) to find leaks and breaks, and Hunter Water's approach to digital metering.

Wyee Sewer Scheme

In August 2019, the CCAG met at the Wyee Community Centre and received a presentation on progress with the Wyee Backlog Sewer Scheme. The \$36 million project will deliver reticulated sewer services to 400 properties within the township of Wyee for the first time. The presentation allowed for discussion of other backlog sewer priority areas, and IPART's approved pricing methodology.

Our people – diversity and inclusion

In March 2020, CCAG members engaged in a discussion about reconciliation and Hunter Water's first Reconciliation Action Plan (RAP). The discussion formed part of a broader conversation regarding Hunter Water's 'Our People' business plan goal.

Customer hardship support

Due to COVID-19 social distancing, the CCAG's May 2020 meeting was held electronically via Zoom. The Group participated in a discussion about the impacts of COVID-19 on Hunter Water customers, including the efforts underway to support customers experiencing adversity as a result of COVID-19.

5.2 Actions taken to resolve root causes of complaints

There was a 7.5% decrease in total water and sewerage complaints in 2019-20.

Billing and account complaints decreased by 24% in 2019-20, driven by fewer meter-reading complaints. We attribute this to improved billing accuracy driven by the introduction of a new meter reading software that incorporates the use of photos to confirm higher or lower than normal meter readings for meter read quality checks.

Water quality complaints increased by 17% in 2019-20. This increase was expected, due to sourcing a higher proportion of water from the Tomago Sandbeds groundwater aquifer as a management response to drought conditions and declining water storage levels. This water source contains a higher concentration of Manganese – and can be associated with increased 'dirty water' complaints. We expect to cease operating the Tomago Borefields during 2020. However, water quality complaints are likely to persist during the next 12 months due to increased levels of Manganese already present in the network.

Water service complaints decreased by 9% in 2019-20. Sewer odour complaints were slightly lower than the previous year, although other sewerage service complaints were consistent with performance in prior



years. Most odour complaints were recorded during dryer weather periods and were typically related to septicity based issues at waste water pump stations or rising main outlets.

On average 98% of complaints were resolved within 10 working days. We have continued to focus on responding to and closing longer-term outstanding complaints.

We maintained the commitment tracker, introduced in March 2019, to monitor the commitment made to customers for the delivery of longer term capital project works. The project works enhance water and wastewater network system performance and provide overall improvement to services for our customers. To ensure continued focus in this space, projects are tracked and progress is regularly reported to our executive management team.

The overall number of active complaints was maintained at a year to date average of 84, well below the KPI target of 100. Responses were provided within 2 business days to 100% of cases referred by the Energy and Water Ombudsman of NSW (EWON).

5.3 Changes to customer and stakeholder documentation and procedures

Hunter Water's Operating Licence Reporting Manual requires it to report any changes to the following documents and procedures.

5.3.1 Customer Contract

Our Operating Licence includes a Customer Contract that clarifies the relationship between Hunter Water and our customers and consumers. The Customer Contract provides clarity on the rights and obligations of each party, describes the services we provide to our customers, payment terms and assistance options for customers experiencing financial hardship, and information on enquiries, complaints and disputes.

There have been no changes to the Customer Contract during 2019-20.

5.3.2 Procedure for payment difficulties and actions for non-payment

In 2019-20, we focused on strengthening partnerships with key stakeholders, such as community service providers, government departments and other utilities. This helps our customer care team identify and locate our most vulnerable customers early. We used our customer segmentation data to identify and target those geographical areas where our most vulnerable customers are located. This data has reinforced information on locations for our 'Bring Your Bills Day' (BYBD) initiatives and assists our early engagement campaigns to provide tailored support to those customers that are high needs and utilising Payment Assistance Support (PAS). This enables a wraparound approach to be provided early, avoiding debt growth for those struggling. We have also increased the use of SMS technology for early engagement.

We revised our collection strategies and business rules from mid-March to June 2020 in direct response to COVID-19 to support those customers financially impacted. This saw us cease all pro-active collection measures including restriction of service, include non-residential customers into our hardship programme for the first time, and offer flexible payment arrangement along with PAS to those identified as requiring further support. During the pandemic period we have undertaken an advertising campaign titled 'All in this Together' to highlight the assistance options available to those needing support. In collaboration with EWON, we introduced our first 'virtual' BYBD event to allow residential customers the chance to digitally connect (via phone or video link) with not only Hunter Water but many other partnering service providers and support agencies within our region. We will continue to review our procedures for customers experiencing payment difficulty and our actions for non-payment on a regular basis to ensure all of our customers have access to support.



5.3.3 Customer Advisory Group charter

In May 2018, Hunter Water engaged the University of Technology Sydney's Institute for Sustainable Futures to assist in a strategic review of the Customer and Community Advisory Group (CCAG). The review was initiated following the change of scope in the CCAG in line with the 'advisory group' status of the CCAG codified in the Operating Licence¹⁶ (the CCAG's predecessor was the Community Consultative Forum).

The updated Charter was developed in close collaboration with the membership, and has been re-ordered to better match with the Operating Licence requirements. The updated Charter was endorsed by the Committee, prior to formal adoption by Hunter Water's Board of Directors.

No changes were made to the CCAG charter during 2019-20.

A copy is available on the Group's website: www.yourvoice.hunterwater.com.au/ccag

5.3.4 Internal complaints handling procedure

A Customer Complaint Management Standard as well as a Complaint Handling Guideline (internal document) compliant with AS/NZS 10002:2014 are in place. This Standard incorporates internal roles & responsibilities and is monitored and reviewed on a monthly basis.

Amendments were made to the Standard, Clauses 4.2, 4.5 in September 2019. Amendments were made to the Guideline (internal document only) in April 2020. These amendments increased access to information and resources for the customer care team, improved alignment with the Customer Contract and the related documents section was updated to provide more simplistic information about how we manage complaints.

5.3.5 External dispute resolution scheme (EWON)

Hunter Water is a member of EWON. Annual fees were paid for the 2019-20 period. No changes were made in 2019-20. Our complaints handling brochure was updated in October 2019 and retained the same information in relation to external dispute resolution services. Information regarding EWON with a direct link to EWON's website and services is available on our website.

Complaints Handling Brochure https://www.hunterwater.com.au/documents/assets/src/uploads/documents/Customer-Information/ComplaintsHandlingOct2019Final_print-ready.pdf

Link to EWON website https://www.hunterwater.com.au/contact-us/compliments-complaints

5.4 Understanding customer and community expectations

Developing a deeper understanding of customer and community expectations in order to inform decision making is a strategic priority for Hunter Water. We used the regulatory requirement to survey our customers by 30 June 2020 for the purpose of informing a review of system performance standards and rebates as an opportunity to take a 'big picture' view and gain foundational insights about valued services.

Between April and June 2020 almost 1,200 residential households shared their views through qualitative and quantitative activities including depth interviews, an online bulletin board and online survey. These activities have helped us understand:

- The service levels and attributes that Hunter Water customer's value.
- The current level of customer satisfaction with Hunter Water's delivery of valued services.
- Customers' expectations about rebates for service failures.

¹⁶ NSW Government 2017, Hunter Water Operating Licence 2017-2022.



This customer research was the first in a multi-phased approach to customer engagement planned by Hunter Water to integrate customer views into business decision making and regulatory processes. Analysis of cost-service level trade-offs is intended to follow.



6 GLOSSARY

6.1 Acronyms

Process	Description
AWTP	Advanced Water Treatment Plant
ADWG	Australian Drinking Water Guidelines
AGWR	Australian Guidelines for Water Recycling
AMS	Asset Management System
CCAG	Customer and Community Advisory Group
CCP	Critical Control Point
CMP	Catchment Management Plan
СТ	Contact time
CTGM	Chichester Trunk Gravity Main
DOS	Disinfection Optimisation Strategy
DPIE	Department of Planning, Industry and Environment
DWQIP	Drinking Water Quality Improvement Plan
DWQMS	Drinking Water Quality Management System
ELWC	Economic Level of Water Conservation
EMP	Environmental Management Plan
EMS	Environmental Management System
EPA	NSW Environment Protection Authority
ERM	Enterprise Risk Management
EWON	Energy and Water Ombudsman of NSW
GIS	Geographic Information Systems
GL/year	Gigalitres per year – one Gigalitre is a measure of volume equal to one billion Litres
HLLS	Hunter Local Land Services
HU	Hazen unit
ICT	Information & Communication Technology
ILI	Infrastructure Leakage Index
IMS	Integrated Management System
IPART	Independent Pricing and Regulatory Tribunal
ISMS	Information Security Management Systems
ISO	International Organization for Standardization
KPI	Key Performance Indicator
LGCS	Large Scale Generation Certificates
LHWP	Lower Hunter Water Plan
LHWSP	Lower Hunter Water Security Plan
L/s	Litres per second
mg/L	Milligrams per litre – one milligram is a measure of mass or weight equal to one thousandth of a gram
mJ/cm ²	Millijoules per square centimetre – one millijoule is a measure of energy equal to one thousandth of a Joule
ML/day	Megalitres per day – one megalitre is a measure of volume equal to one million litres
MPN	Most probable number
m ³ /h	Cubic metres per hour is a measure of volume flow rate
NCR	Non-compliance report
NPR	National Performance Report



NTU	Nephelometric Turbidity Units
NWI	National Water Initiative
OEH	NSW Office of Environment and Heritage
PAS	Payment Assistance Support
PFAS	Per- and poly-fluoroalkyl substances
QMS	Quality Management System
RAP	Reconciliation Action Plan
R&D	Research and Development
RFS	NSW Rural Fire Service
RWQMP	Recycled Water Quality Management Plan
RWQMS	Recycled Water Quality Management System
RWTP	Recycled Water Treatment Plant
SCADA	Supervisory control and data acquisition
UV	Ultra Violet
UVT	Ultra Violet Transmissivity
WHS	Work Health and Safety
WSAA	Water Services Association of Australia – peak industry body for the Australian water industry
WTP	Water Treatment Plant
WWTW	Wastewater Treatment Works

6.2 Water treatment terminology

Process	Description
Aeration	Aeration is typically used as a first step in the treatment of groundwater. The main function of aeration is to remove carbon dioxide and hydrogen sulphide from the water, and to add oxygen, which assists in iron removal. Water extracted from the Anna Bay Sandbeds and treated at Anna Bay and Nelson Bay Water Treatment Plants is naturally very low in iron and hydrogen sulphide, so the purpose of aeration at these plants is essentially to remove carbon dioxide and add oxygen.
Coagulation / Flocculation	During coagulation, liquid aluminium sulphate (alum) and/or polymer is added to untreated water (raw water). When mixed with the water, this causes tiny particles that are naturally present in the source water, when extracted, to stick together or coagulate. The heavier / larger coagulated material called 'floc' is easier to remove by settling or filtration.
Disinfection	Water is disinfected before it enters the distribution system to ensure that any disease- causing bacteria, viruses, and parasites are destroyed. Chlorine is used because it is a very effective disinfectant, and residual concentrations can be maintained to guard against possible biological contamination in the water distribution system. CT values are used to calculate disinfectant dosage for the chlorination of drinking water. The CT value is the product of the concentration of chlorine and the contact time with the water being disinfected. It is expressed in units of min.mg/L.
Filtration	Water flows through a filter designed to remove particles in the water. The filters are made of layers of sand and gravel, and in some cases, crushed anthracite. Filtration collects the suspended impurities in water and enhances the effectiveness of disinfection. The filters are routinely cleaned by backwashing. Microfiltration is a filtration process which removes particles from water by passage through a microporous membrane.
Fluoridation	Water fluoridation is the treatment of community water supplies for the purpose of adjusting the concentration of the free fluoride ion to the optimum level sufficient to



	reduce dental decay. Hunter Water is required to fluoridate in accordance with the NSW <i>Fluoridation of Public Water Supplies Act 1957</i> .
Membrane microfiltration	Membrane microfiltration is a type of physical filtration process where water is passed through a special pore-sized membrane to separate microorganisms and suspended particles from the raw water.
Powdered activated carbon (PAC) dosing (event based)	Powdered Activated Carbon (PAC) dosing is used to remove organic compounds from the water supply such as Geosmin and Methyl-Isoborneol (MIB) that periodically occur in surface waters. Geosmin and Methyl-Isoborneol (MIB) are naturally occurring compounds that have a musty, earthy taste and odour.
pH Correction	Lime is added to the filtered water to adjust the pH and stabilise the naturally soft water in order to minimise corrosion in the distribution system, and within customers' plumbing.
Sedimentation	As the water and the floc particles progress through the treatment process, they move into sedimentation basins where the water moves slowly, causing the heavy floc particles to settle to the bottom. Floc which collects on the bottom of the basin is called sludge, and is piped to drying lagoons.
Two-stage filtration (Lemon Tree Passage Water Treatment Plant)	 Flocculation occurs within roughing filters (also referred to as adsorption clarifiers) before separation is achieved. In the roughing filter the coagulated water is fed upwards through a bed of granular plastic media where the flocs are trapped within the filter media and the filter overflow exits for further treatment. Final polishing of water from the roughing filters occurs within the dual media (ie coal/sand) rapid gravity filters.

6.3 Wastewater treatment terminology

Process	Description
Bioreactor	A bioreactor is a device that supports an aerobic or anaerobic biological environment.
Chloramine dosing	The application of chlorine and ammonia to water to form chloramines for the purpose of disinfection.
Chlorination	The application of chlorine to wastewater, generally for the purpose of disinfection, but frequently for accomplishing other biological or chemical results - aiding coagulation or controlling odours or sludge bulking in wastewater.
Clarification	Any process or combination of processes the main purpose of which is to reduce the concentration of suspended matter in a liquid.
Dissolved air floatation	Dissolved air flotation is a water treatment process where wastewater is clarified by the removal of suspended matter such as oil or solids. Air is dissolved under pressure in wastewater and then released at atmospheric pressure in a tank. The released air forms tiny bubbles which stick to the suspended matter causing it to float to the surface, where it is removed by a skimming device.
Grit removal	Grit removal is accomplished by providing an enlarged channel or chamber that causes the flow velocity to be reduced and allows the heavier grit to settle to the bottom of the channel where it can be removed.
Maturation pond	A shallow pond that ensures sunlight penetrates the full depth for photosynthesis to occur. Oxygen is provided by algae during photosynthesis and wind-aided surface aeration. These ponds are often mixed by recirculation to maintain dissolved oxygen throughout their entire depth.
Membrane filtration	Membranes are thin and porous sheets of material able to separate contaminants from water when a driving force is applied. They are used to remove bacteria and other microorganisms, particulate material, micropollutants, and natural organic material.



Microfiltration	A pressure-driven membrane filtration process that separates particles down to approximately 0.1 μ m diameter from influent water using a sieving process.
Oxidation ponds	A man-made body of water in which waste is consumed by bacteria.
Reverse osmosis	The Reversed Osmosis (RO) process uses a semi-permeable membrane to separate and remove dissolved solids, organics, pyrogens, submicron colloidal matter, viruses, and bacteria from water. The process is called 'reverse' osmosis since it requires pressure to force pure water across a membrane, leaving the impurities behind.
Screening	Screening removes gross pollutants from the wastewater stream to protect downstream operations and equipment from damage. The screen has openings that are generally uniform in size. It retains or removes objects larger than the openings. A screen may consist of bars, rods, wires, gratings, wire mesh, or perforated plates.
Secondary treatment	Typically, a biological treatment process that is designed to remove approximately 85% of the biological oxygen demand and influent suspended solids. Some nutrients may incidentally be removed, and ammonia may be converted to nitrate.
Sedimentation	The process of settling and depositing of suspended matter carried by water or wastewater. Sedimentation usually occurs by gravity when the velocity of the liquid is reduced below the point at which it can transport the suspended material.
Sludge digesters	Tank in which complex organic substances like sewage sludges are biologically dredged. During these reactions, energy is released and much of the sewage is converted to methane, carbon dioxide, and water. These changes take place as microorganisms feed on sludge in anaerobic or aerobic digesters.
Tertiary filtration (dual media)	Filtration is used to separate nonsettleable solids from water and wastewater by passing it through a porous medium. Dual media filters use two media, commonly crushed anthracite coal and sand. Tertiary treatment is the final cleaning process that improves wastewater quality before it is reused, recycled or discharged to the environment.
Total Nitrogen	Excessive amounts of Total Nitrogen may lead to low levels of dissolved oxygen, therefore load limits are set to protect downstream water quality from algal blooms.
Trickling filters	Trickling filters are processes that use a static medium such as rocks for growing a film or biomass and then trickling the wastewater over this medium.
UV disinfection	Ultraviolet irradiation achieves disinfection by inducing photobiochemical changes within microorganisms. When ultraviolet radiation is absorbed by the cells of microorganisms, it damages the genetic material in such a way that the organisms are no longer able to grow or reproduce, thus ultimately killing them.

6.4 Key physical, chemical and microbiological drinking water quality parameters

Water Quality Parameter	Description
Aluminium	Aluminium occurs naturally in untreated water in the form of silts and clays. Aluminium sulphate (alum) is also used as a flocculent to remove unwanted colour and turbidity from water supplies. Research has shown that aluminium in drinking water does not make up a substantial proportion of aluminium ingested, and that aluminium in drinking water is no more bio-available than any other source.
Chlorine	Chlorine is used as a disinfectant in water treatment. It controls potentially harmful micro- organisms to ensure the safety of drinking water.
Colour	Colour is measured in Hazen Units (HU). Colour can originate from organic matter in the soil through, or over, which the water has passed.



Copper	Copper is naturally present in both treated water and throughout the distribution system. However, soft water in contact with copper plumbing systems can on occasion give higher concentrations of copper at the customer tap. The incidence of high copper concentrations within Hunter Water's area of operation is very low, and customer complaints are infrequent.
E. coli	<i>Escherichia coli</i> is an indicator bacteria, that is, bacteria which are not normally harmful in themselves, but may indicate the presence of other pathogenic (disease-causing) micro-organisms. <i>E. coli</i> is a type of thermo-tolerant coliform bacteria, and is nearly always present in the faeces of humans and other warm-blooded animals. <i>E. coli</i> is generally regarded as the most specific indicator of faecal contamination, and therefore an important indicator for public health.
Fluoride	In accordance with the <i>Fluoridation of Public Water Supplies Act 1957</i> , fluoride is added to the water to help prevent tooth decay and generally improve dental health.
Iron and Manganese	Iron and manganese may occur naturally at low levels in the water and may be responsible for taste and staining problems with the water.
Lead	Lead levels in Hunter Water's distribution system are typically less than the 0.001 mg/L limit of detection and well below the health guideline of 0.01 mg/L. Lead levels in customer plumbing can occasionally be elevated where water has lengthy residence time in contact with brass plumbing fittings. These contain small quantities of lead, and leaching into the water can occasionally occur. However this is very unlikely to cause continually elevated lead levels. Note that within the area serviced by Hunter Water, there is little or no lead pipework left in the plumbing systems.
рН	pH is a measure of the hydrogen ion concentration of water. A pH of 7 is neutral, greater than 7 is alkaline, and less than 7 is acidic. pH is important because it can affect the disinfection process.
Trihalomethanes	THMs are formed during the disinfection process by reaction between chlorine and mainly naturally-occurring organic substances. Treatment processes are controlled to minimise their production.
Turbidity	Turbidity refers to the cloudiness or dirtiness of water, and is measured by a light scattering technique. Turbidity is measured in Nephelometric Turbidity Units (NTU).
Zinc	As with other heavy metals, treated and reticulated water supplied by Hunter Water contains only very low levels of naturally occurring zinc. Some elevated levels in customer plumbing can be caused by old galvanised pipes and some leaching ("dezincification") from older style brass fittings. Newer plumbing systems do not use galvanised steel, and brass fittings are normally "dezincification resistant", so levels of zinc at the tap are rarely elevated.