

2018 Asset Management System Effectiveness Review – Water Corporation

Review Report

3608-01

Prepared for
ERAWA

22 February 2019



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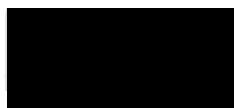
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Executive Summary

General

Water Corporation ('the licensee') is a State-owned entity that is the principal provider of water, wastewater, recycled water, drainage and bulk irrigation services in Western Australia. Its operating area covers Western Australia and it provides services where there is no other licenced supplier. Water Corporation has one shareholder being the Minister for Water. Water Corporation has offices located across Western Australia.

Water Corporation has an asset base of \$36 billion (replacement value). This asset base includes two desalination plants, 128 dams and weirs and 96 licenced borefields for water supply. Water Corporation delivered 361GL of water in 2016/17. The largest water supply scheme is the Integrated Water Supply Scheme which supplies Perth, Kalgoorlie, the Wheatbelt and some parts of the South West. This scheme delivered 283GL of water in 2016/17, accounting for 78% of all supplies.

Water Corporation's wastewater collection and treatment network includes 16,903km of sewer mains and 113 treatment plants. 164 GL of wastewater was collected and treated in 2016/17. Water Corporation operates 75 water recycling schemes across the state.

Water Corporation's drainage assets are located in Perth where it receives stormwater from networks owned by local governments and in the Peel, Great Southern and South West Regions. It controls 2,549 km of urban and rural drains. Water Corporation is also a bulk supplier to irrigation schemes and delivered 5,731 ML (excluding the south-west irrigation area) of water to four irrigation schemes in 2016/17.

Asset Management Review Objectives

Cardno was commissioned by the ERA to undertake an asset management system review of Water Corporation in accordance with the requirements set out in Section 24 of the *Water Services Act 2012 (WA)*.

The asset management system review has been conducted in order to assess the effectiveness of Water Corporation's asset management system. The asset management system review covers the period 1 July 2015 to 30 June 2018. The review assessed the performance of Water Corporation against the 12 asset management processes and 56 effectiveness criteria set out in the ERA Guidelines.

This report outlines the findings of the review of Water Corporation to fulfil the above objectives. The review team visited Water Corporation's offices between 5 November 2018 and Thursday 8 November 2018.

The review was carried out in accordance with the *Audit and Review Guidelines: Water Licences*, as published by the ERA in July 2014.

Asset Management System Review

Findings of the Previous Asset Management System Review

The previous asset management system review identified the following recommendations:

1. R4/2013 - Asset Planning: We recommend that Water Corporation complete the remaining Asset Class Strategies, should they be required.

Resolved during review period

2. R7/2013 and R20/2013 - Asset Operations: Water Corporation should implement the SCADA Data Standards into its business processes.

Resolved during review period

3. R17/2013 – We recommend that Water Corporation complete extension of the current training to provide operators in the field with the importance of data collection, the role they play in asset management and how their job is important to the greater business outcomes

Resolved during review period

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4. R21/2013 - Asset Maintenance: Water Corporation should update maintenance standards and procedures to reflect the new business structure.
Resolved during review period
 5. R26/2013 - Asset Maintenance: Water Corporation should formalises its approach to fault mode analysis and develops guidelines to assist in its application.
Resolved during review period
 6. R27/2013 - Asset Maintenance: Water Corporation should review the detailed data needs for the maintenance process, including data integrity requirements and source system; implement system changes and changes to collection processes where required; develop reports to review and validate the data and KPIs to monitor process compliance; and monitor data on a regular basis and feedback KPIs and non-compliance to field users.
Resolved during review period
 7. R28/2013 – Asset Maintenance: Water Corporation should incorporate the data capture as part of planned maintenance and/or inspections as part of normal operations.
Resolved during review period
 8. R1/2015 - Risk Management: Water Corporation should review its guidance material for the Asset Risk Assessment with a group of users (input and end users) to identify any areas of ambiguity in the guidance provided or opportunities for improvement.
Resolved during review period
 9. R2/2015 - Risk Management: Water Corporation should communicates to all users of the Asset Risk Assessment tool its desired approach to scoring the likelihood and consequence of asset risks. That is, whether the risk scorer is to consider business as usual operations, a worst case scenario or some other operating context when undertaking the scoring.
Resolved during review period
 10. R3/2015 - Risk Management: Water Corporation should review all existing system risks to identify high risks that are overdue for review and/or endorsement and completes the scheduled review and/or endorsement of the risks.
Resolved during review period
 11. R4/2015 - Risk Management: Water Corporation should examine the review and endorsement process (activities and timing) for system risks to confirm if the current approach is appropriate for its business needs and implements any changes that it determines are necessary.
Resolved during review period
 12. R5/2015 - Contingency Planning: Water Corporation should identify for its operations the desired level of application, coverage and contents of contingency plans and implement contingency planning consistently using these criteria through a program of activity.
Partially resolved during review period

13. R6/2015 - Capital Expenditure: Water Corporation should review its capitalisation policy to confirm whether the access chamber lids should be treated as capital assets.

Resolved during review period

14. R7/2015 - Review of AMS: Water Corporation should confirm whether it has a corporate CAR system and, if not, looks to implement such a system.

Resolved during review period

Findings of the Current Asset Management System Review

The review of the Water Corporation asset management system identified that the majority of asset management processes were rated A1. Two processes were rated A2.

The following recommendations and process improvement opportunities were identified.

Reference (no./year)	Asset Management System Component	Issue	Auditor's recommendation
R1/2018	<i>Asset planning - Asset management plan covers key requirements</i>	The Asset Management Strategy includes completing the Asset Class Plans in the section on Continuous Improvement and Review; however, no details of the Asset Class Plans to be developed or the proposed timeframes to complete them is included in the document.	We recommend that Water Corporation modifies the Summary of Improvement Opportunities include in the Asset Management Strategy to include due dates and accountabilities for each of the identified improvements.
R2/2018	<i>Asset management information systems - Input controls include appropriate verification and validation of data entered into the system</i>	Water Corporation's tracking of work order data quality has identified that quality for some measures are persistently not meeting its requirements	We recommend that Water Corporation be required to report annually on the progress of its nominated actions to address the observed shortcomings: <ol style="list-style-type: none"> 1. Engineer out drivers of errors 2. Provide real time validation on entry Refine the data integrity monitoring
R3/2018	<i>Contingency Planning - Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks</i>	In response to recommendation R5/2015, Water Corporation has developed the Operational Contingency Planning Standard and Contingency Planning - development, testing and Review Procedure. These are supported by a template and a Framework for Critical Assets. These actions address the parts of the recommendation to identify the level of application, coverage and contents of contingency plans. Water Corporation has documented the contingency plans that it has prepared under this revised approach and we reviewed a sample of contingency plans at our review meetings. Water Corporation also provided an exercise and test program for 2018. Only a small number of plans have been tested to date. This recommendation has therefore been left open (and transferred to R2/2018) as consistent implementation is supported by testing and refinement of the plans.	We recommend that Water Corporation continues its program of testing contingency plans so that all Criticality 5 plans are tested by December 2019 and all Criticality 4 plans are tested by June 2020 and that the outcomes of the testing are documented and updates to the plans arising from the lessons learned are actioned.

Assessment of the Effectiveness of the Asset Management System

Based on the outcomes of the Review, Cardno found that the asset management processes and measures have been well implemented and are being followed. It is Cardno's' opinion that the asset management system is operating effectively given the provision of the licensee's potable and non-potable water supply service, sewerage services, irrigation services and drainage services.

The ratings awarded reflect that Water Corporation generally has well developed asset management practices. Water Corporation has substantially revised its asset management system since 2015, building on the existing framework while moving towards alignment with the international standard for a management system approach to asset management, ISO55001:2014.

Asset Management System Review - Overall Effectiveness

A summary of our assessment of the effectiveness of Water Corporation's Asset Management System is provided in Section 4.2. All elements were rated "A" for policy and procedures. All elements but two (environmental analysis and contingency planning) were rated "1" for performance.

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1 Introduction

1.1 Background

The Economic Regulation Authority (ERA) is responsible for regulating the licensing schemes for gas, electricity and water services in Western Australia. The primary objective of regulation is to ensure the provision of a competitive and fair environment, particularly where businesses operate as natural monopolies.

Water Corporation ('the licensee') holds a water services operating licence (WL32, Version 15) which permits it to provide potable water supply services, non-potable water supply services, sewerage services, drainage services and irrigation services and undertake, maintain and operate any associated works within the relevant operating areas set out in Plan Numbers OWR-OA-301(B) (potable water services), OWR-OA-302(B) (sewerage services), OWR-OA-306 (drainage services), OWR-OA-175(E) (irrigation services) and OWR-OA-175-1(B) (irrigation services). Under the terms of the licence, Water Corporation can provide non-potable water supply services in any of the operating areas set out in the Plan Numbers listed above.

The operating licence was granted by the ERA on 28 June 1996 and last amended on 19 July 2016. This is the second revision of Water Corporation's operating licence since the previous asset management system review was carried out. The licence was first amended during this period on 1 July 2016.

1.2 Overview of the Water Corporation Area and the Role of Water Corporation

Water Corporation is a State government-owned entity that is the principal provider of water, wastewater, recycled water, drainage and bulk irrigation services in Western Australia. Its operating area covers Western Australia and it provides services where there is no other licenced supplier. Water Corporation is accountable to the Minister for Water. Water Corporation has offices located across Western Australia.

Water Corporation has an asset base of \$37 billion (replacement value). This asset base includes two desalination plants, 125 dams and weirs and 96 licenced borefields for water supply. Water Corporation delivered 363GL of water in 2017/18. The largest water supply scheme is the Integrated Water Supply Scheme which supplies Perth, Kalgoorlie, the Wheatbelt and some parts of the South West. This scheme delivered 248GL of water in 2017/18, accounting for 68% of all supplies.

Water Corporation's wastewater collection and treatment network includes 17,051km of sewer mains and 112 treatment plants. 164 GL of wastewater was collected and treated in 2017/18. Water Corporation operates 75 water recycling schemes across the state.

Water Corporation's drainage assets are located in Perth where it receives stormwater from networks owned by local governments and in the Peel, Great Southern and South West Regions. It controls 2,547 km of urban and rural drains. Water Corporation is also a bulk supplier to irrigation schemes and delivered 5,234 ML (excluding the south-west irrigation area) of water to four irrigation schemes in 2017/18

Asset quantities, historical cost and carrying amount for Water Corporation's assets as reported in its 2018 Annual Report. The historical cost and carrying amount for these assets are summarised in Table 1-1.

Table 1-1 Summary of Water Corporation assets by historical cost and carrying amount (\$M 2018)

	Historical Cost (\$M 2018)	Carrying Amount (\$M 2018)	% Historical cost
System assets	20,925	15,110	90%
Land and buildings	901	743	4%
Support assets	349	116	1%
Works in progress	1,139	1,139	5%
Subtotal - plant and equipment	23,314	17,108	100%

1.3 Purpose of this Report

As a condition of its licence, Water Corporation is required to conduct an asset management review that assesses the measures taken by the licensee for the proper management of assets used in the provision and operation of services and, where appropriate, the construction or alteration of relevant assets .

Section 24 of the *Water Services Act 2012* obligates the licensee to provide the Authority with a report by an independent expert acceptable to the Authority as to the effectiveness of the asset management system not less than once in every 24 month period (or such longer period as the Authority allows).

The asset management system review assesses performance against each of the 12 asset management process specified in the *ERA Audit and Review Guidelines: Water Licences*, namely:

- > asset planning
- > asset creation/acquisition
- > asset disposal
- > environmental analysis
- > asset operations
- > asset maintenance
- > asset management information system
- > risk management
- > contingency planning
- > financial planning
- > capital expenditure planning
- > review of the asset management system.

2 Scope of Work

2.1 Asset Management System Review Objectives

The overall objectives of this asset management system review were to:

1. Provide the Authority with an independent assessment of the effectiveness of the licensee's asset management system in respect of the assets that are delivering the services covered by the licence.
2. Provide recommendations to address asset management deficiencies, or opportunities to improve the standard of asset management, if any.

2.2 Scope of Work

The scope of work of this review included:

- > Interviews with key staff members from Water Corporation to:
 - assess the effectiveness of the actions taken to address the recommendations included in the previous review report
 - assess performance against each asset management process specified in the *ERA Audit and Review Guidelines: Water Licences (July 2014)* (Audit and Review Guidelines).
- > Reviews of documents, procedures and policy manuals in relation to financial management and planning, service performance standards, asset management, operations and maintenance functions and reporting
- > Testing and assessment to determine whether the procedures and policies are followed and determine their effectiveness
- > Preparation of a review report in accordance with the format specified in the Audit and Review Guidelines.

2.2.1 Areas of Special Focus

There were no areas of special focus advised by the ERA.

2.3 Methodology and Approach

The review was undertaken in accordance with ASAE3000. Our approach to the reporting work was to work closely with the licensee so that comments and challenges could be responded to and addressed before the review report was finalised. The key areas of our approach included:

- > A start-up discussion (by telephone) with ERA to discuss the scope of works for the review, identify any new issues arising from changes to the Licence or operating environment requirements and review timing and logistics.
- > A start-up discussion with Water Corporation to confirm the scope of work and to confirm review logistics.
- > Preparation of a draft review plan for comment by the Water Corporation. The review plan identified the number and location of the meetings with Water Corporation personnel, the information to be addressed and the reviewers responsible.
- > Submission of the draft review plan to the ERA for approval
- > Establishing a secure fileshare site for Water Corporation to upload documents to. This allowed us to review the key documentation before we commenced the site work in order to make efficient use of the time for all involved parties. Within this report, we have included the document identification number from Water Corporation's document management system to identify documents. These are preceded by a #, for example (#123456).
- > A start-up meeting on-site at the beginning of our review work
- > On-site review work comprising:
 - Face-to-face interviews with business staff responsible for the review area
 - Demonstration of key information systems

- Sample testing for outcome compliance (assessing a sample of documents to confirm procedures / policies are followed and implemented)
 - Review breach register and any non-compliances and assess if any corrective action was undertaken and its effectiveness
 - Site visits to view water service assets.
- > Preliminary review feedback at the review close-out meeting
 - > Preparation of a draft report for the ERA and Water Corporation's review and comment
 - > Preparation of a final report for submission to the ERA.

Our methodology for completing this asset management system review assignment was based on:

- > A risk assessment that determined the priority of each review area, using the risk management framework in Appendix A
- > Our understanding of the licensee's business
- > The experience of our review team in undertaking regulatory reviews which has been gained in several jurisdictions in Australia and in the United Kingdom
- > The outcome of the previous review of the licensee, which was undertaken by Cardno.

Our review methodology, including the key documents required to be reviewed and the supporting systems that we requested to see demonstrated, is detailed in Table 2-1.

Table 2-1 Asset Management Review Methodology

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
Asset planning	<ul style="list-style-type: none"> Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning Service levels are defined Non-asset options (e.g., demand management) are considered Lifecycle costs of owning and operating assets are assessed Funding options are evaluated Costs are justified and cost drivers identified Likelihood and consequences of asset failure are predicted Plans are regularly reviewed, and updated 	<ul style="list-style-type: none"> Review and assess the adequacy of asset planning processes Review and assess adequacy of asset management plans Assess if asset management plans are up to date Assess implementation of asset management plans (status) Assess whether the asset management plan clearly assigns responsibilities and if these have been applied in practice 	<ul style="list-style-type: none"> GIS Asset database / information system 	<ul style="list-style-type: none"> Overview of planning approach Population projections Infrastructure Planning Reports Example planning reports Review of asset management plans Service level agreements
Asset creation and acquisition	<ul style="list-style-type: none"> Full project evaluations are undertaken for new assets Evaluations include all life-cycle costs Projects reflect sound engineering and business decisions Commissioning tests are documented and completed Ongoing legal / environmental / safety obligations of the asset owner are assigned and understood 	<ul style="list-style-type: none"> Review adequacy of policies and procedures in relation to asset creation and acquisition Review examples of creations / acquisitions to check if policies and procedures were followed and check costs against estimates 	<ul style="list-style-type: none"> Asset database / information system 	<ul style="list-style-type: none"> Policies and procedures for asset creating and acquisition. Accounting and engineering
Asset disposal	<ul style="list-style-type: none"> Under-utilised and under-performing assets are identified as part of a regular systematic review process The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken Disposal alternatives are evaluated There is a replacement strategy for assets 	<ul style="list-style-type: none"> Review adequacy of policies and procedures in relation to asset disposal, asset replacement, identification of under-performing assets Determine if a review on the usefulness of assets are undertaken Review examples to check that policies and procedures are being followed 	<ul style="list-style-type: none"> Asset database / information system 	<ul style="list-style-type: none"> Policies and procedures for asset disposal. Accounting and engineering
Environmental analysis	<ul style="list-style-type: none"> Opportunities and threats in the system environment are assessed 	<ul style="list-style-type: none"> Review performance and service standards over audit period 		<ul style="list-style-type: none"> Policies and procedures Planning reports

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
	<ul style="list-style-type: none"> Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved Compliance with statutory and regulatory requirements Achievement of customer service levels 	<ul style="list-style-type: none"> Review performance / identify any breaches and non-compliances and corrective action taken Review adequacy of reporting and monitoring tools 		<ul style="list-style-type: none"> Customer service Compliance reports Strategic plans (if appropriate)
Asset operations	<ul style="list-style-type: none"> Operational policies and procedures are documented and linked to service levels required Risk management is applied to prioritise operations tasks Assets are documented in an Asset Register, including asset assessment of assets' physical, structural condition and accounting data Operational costs are measured and monitored Staff receive training commensurate with their responsibilities 	<ul style="list-style-type: none"> Review adequacy of policies and procedures in relation to asset operations Review staff skills / training and resources available Check that operations procedures are being followed including testing of the asset register, observation of operational procedures and analysis of costs Identify any operational events and corrective actions 	<ul style="list-style-type: none"> Asset information system SCADA (Supervisory control and data acquisition) 	<ul style="list-style-type: none"> Asset register Operations procedures Operational costs Daily / weekly / monthly check sheets Staff skills / resourcing structure
Asset maintenance	<ul style="list-style-type: none"> Maintenance policies and procedures are documented and linked to service levels required Regular inspections are undertaken of asset performance and condition Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule Failures are analysed and operational / maintenance plans adjusted where necessary Risk management is applied to prioritise maintenance tasks Maintenance costs are measured and monitored 	<ul style="list-style-type: none"> Review adequacy of policies and procedures in relation to asset maintenance / maintenance functions Check that policies and procedures have been followed including testing of maintenance schedules, analysis of costs, Review maintenance schedules / plans Identify any maintenance events and corrective actions 	<ul style="list-style-type: none"> Asset information system 	<ul style="list-style-type: none"> Maintenance procedures and schedules Record of maintenance Maintenance costs
Asset Management Information System	<ul style="list-style-type: none"> Adequate system documentation for users and IT operators 	<ul style="list-style-type: none"> Review adequacy of asset information system: Asset coverage 	<ul style="list-style-type: none"> Asset Management Information system 	<ul style="list-style-type: none"> AMIS manual AMIS data coverage and quality report

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
	<ul style="list-style-type: none"> Input controls include appropriate verification and validation of data entered into the system Logical security access controls appear adequate, such as passwords and that appropriate system access and functionality is provided to users Physical security access controls appear adequate Data backup procedures appear adequate Key computations related to licensee performance reporting are materially accurate Management reports appear adequate for the licensee to monitor licence obligations 	<ul style="list-style-type: none"> Functionality Data coverage Security User functionality granted is appropriate Review outputs / reports generated by systems and assess suitability for reporting against performance standards / licence obligations 		<ul style="list-style-type: none"> Asset reports
Risk management	<ul style="list-style-type: none"> Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system Risks are documented in a risk register and treatment plans are actioned and monitored The probability and consequence of risk failure are regularly assessed 	<ul style="list-style-type: none"> Review risk assessment coverage Review sample of risk mitigation to check policies and procedures are followed Assess staff understanding of risk management and adequacy of risk management training for staff 		<ul style="list-style-type: none"> Corporate Risk management framework Risk assessment
Contingency planning	<ul style="list-style-type: none"> Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks 	<ul style="list-style-type: none"> Review adequacy / relevance and currency of contingency plans Review if plans have been tested Identify any improvements that have been actioned as a result of testing of the contingency plans 		<ul style="list-style-type: none"> Contingency plans
Financial planning	<ul style="list-style-type: none"> The financial plan states the financial objectives and strategies and actions to achieve the objectives The financial plan identifies the source of funds for capital expenditure and recurrent costs 	<ul style="list-style-type: none"> Review adequacy and effectiveness of financial planning and reporting processes Review current financial plan and assess whether the process is being followed 		<ul style="list-style-type: none"> Financial Plan

Audit Area	Effectiveness Criteria	Approach	Systems	Key Documents
	<ul style="list-style-type: none"> ▪ The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets) ▪ The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period ▪ The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services ▪ Significant variances in actual / budget income and expenses are identified and corrective action taken where necessary 			
Capital expenditure planning	<ul style="list-style-type: none"> ▪ There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates ▪ The plan provides reasons for capital expenditure and timing of expenditure ▪ The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan ▪ There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned 	<ul style="list-style-type: none"> ▪ Review adequacy and effectiveness of capital planning processes through examination of application of process and example documents 	<ul style="list-style-type: none"> ▪ Spreadsheets for capital planning and prioritization 	<ul style="list-style-type: none"> ▪ Capital expenditure planning process outline ▪ Value engineering documents ▪ Risk management applied to investment planning ▪ Program management documents ▪ Review of capex estimate v outturn
Review of AMS	<ul style="list-style-type: none"> ▪ A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current ▪ Independent reviews (e.g., internal audit) are performed of the asset management system 	<ul style="list-style-type: none"> ▪ Determine when the asset management plan was last updated and assess whether any significant changes have occurred ▪ Determine whether any independent reviews have been performed. If so, review results and action taken ▪ Consider the need to update the AMP based on the results of this review ▪ Determine when AMS was last reviewed. 		<ul style="list-style-type: none"> ▪ Asset management plans

2.4 Time Period Covered by the Review

The asset management system review also covers the period from 1 July 2015 to 30 June 2018.

2.5 Time Period of the Cardno Review Process

The review commenced in September 2018 with preparation of the draft Review Plan. Interviews with Water Corporation's staff were carried out between Monday 5 November 2018 and Thursday 8 November 2018 at the Corporation's head office in Leederville, Perth, Western Australia. Site visits to operational sites were carried out on Wednesday 7 November 2018. The sites visited were the operational control room, operational call centre, Munster pump station and overflow and a trunk water main project site in the Goldfields Agricultural Region.

2.6 Details of the Licensee Representatives Participating in the Audit/Review

Details of representatives from the Water Corporation who participated in the review process are provided in Table 2-2 below.

Table 2-2 Details of Licensee Representatives

Name	Role
Ashley Vincent	General Manager - Assets Planning
Meredith Blais	Head of Asset Strategy
Evan Hambleton	Head of Asset Investment Planning Regional
Chris Davie	Head of Operations Performance
David Hughes-Owen	Head of Asset Investment Planning Metro
Renae Farmer	Head of Group Finance
Gary Peach	Acting Head of People & Capability
Nathan Hardwick	Head of Project Management
Brian Robertson	Head of Asset Investment
Sharon Dignard	Head of Strategy Policy & Analytics
Wayne Kearney	Head of Risk & Assurance
Garry Peach	Head of Billing & Assurance
Ed Riley	Head of Digital Services
Rex Jahn	Head of Operational Technology
John Todd	Head of Development Services
Evan McCartin	A/Regional Manager - Goldfields and Agricultural Region (GAR)
Gary Monahan	Alliance Manager – Perth Region Alliance (PRA)
Alan Warburton	Head of Operations Centre
Derek Host	Service Delivery Manager - Goldfields and Agricultural Region (GAR)
Andrew Pascoe	Manager, Regulation & Compliance
Paul Vanderwal	Manager, Asset Management System & Risk
Cade Dawkins	Manager, Strategy Performance & Forecasting
Julia Krsnik	Manager, Integrated Water Cycle Planning - Regional
Ken Walker	Manager, Asset Performance - Regional
Corey Dykstra	Manager, Investment Evaluation
Anthony Paonni	Manager, Budgeting & Reporting
Alison Luobikis	Manager, Operations Analytics & Support
Stephen Vidotto	Manager, Group Financial Performance

Name	Role
Terry Hobson	Manager, Financial Accounting & Reporting
Tania Bauk	Manager, Organisational Development & Performance
Neil Hooley	Manager, Training
Ian Aldridge	Manager, Asset Management Services – Regional
Paul Hurst	Manager, Program Management – Regional
Peter Harding	Project Director
Tino Galati	Manager, In Service Assets - Metro
Vanessa Moscovis	Manager, Integrated Water Cycle Planning - Metro
Steve Christie	Manager, Operations Support
Tony Carlino	Team Leader, Environment
Barbara Simon	Manager, Data Structures
Kris Barlow	Manager, Cyber Security
Peyman Kouchakpour	Manager, Acquisitions
Gary Langham	Manager, Technology Governance
Marc Kessels	Manager, Management Review & Audit
Mandy Damant	Manager, Corporate Risk Management
Mark Busher	Manager, Land Servicing
Lauren Neville	Manager, Zero Harm
David Holthouse	Manager, Operations M&E
Kim Savage	Team Leader, Asset Activity - Regional
Pat Francis	Team Leader, Asset Registration
Drew Palmer	Principal, Investment Portfolio
Karen Riddette	Principal, Asset Management System & Risk
Georgina Hurst	Principal, Strategy Performance & Forecasting
Bob Espie	Principal, Policy & Compliance
Stephen Dejussing	Manager, Change Implementation
Jakob Verhoef	Principal, In Service Assets - Regional
Des Mcewan	Senior Engineer, In Service Assets, Metro
Anne O'Shannon	Specialist, Asset Management System & Risk
Ebru Cotton	Coordinator, Zero Harm Management Systems
Ryan Harris	Welder / Fabricator Tradesperson, Goldfields and Agricultural Region (GAR)
Detroit Norrish	Welder / Fabricator Tradesperson, Goldfields and Agricultural Region (GAR)

2.7 Details of Key Documents and Other Information Sources

Details of the key documents provided to us by Water Corporation and other information sources that were used during the course of this asset management system review are included in Appendix C.

2.8 Details of Reviewers Participating In the Review and Hours Utilised

The review team comprised four staff members from Cardno.

Details of their roles and hours utilised in the review process are provided in Table 2-3.

Table 2-3 Details of Review Team Members

Name	Organisation	Role	Summary of Task	Hours Utilised
Stephen Walker	Cardno	Reviewer/ Project Manager	<ul style="list-style-type: none"> Project Management Prepare review plan Undertake review Prepare review report 	91.5
Justin Edwards	Cardno	Reviewer	<ul style="list-style-type: none"> Undertake review Prepare review report 	118
Patrick Lamb	Cardno	Review assistant	<ul style="list-style-type: none"> Prepare review plan 	91
Christopher Bridge	Cardno	Review assistant	<ul style="list-style-type: none"> Documentation QA review 	26

3 Licensee's Response to Previous Recommendations

In the previous asset management review, a series of actions were recommended or suggested to address asset management deficiencies or process improvement opportunities.

3.1 Previous Review Ineffective Components and Recommendations

Details of the actions completed by Water Corporation against each of the previous asset management system review recommendations are presented in Table 3-1 below.

Table 3-1 Previous Review Ineffective Components and Recommendations

A. Resolved before end of previous review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
	None			
B. Resolved during current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
R4/2013	<p>Asset Planning - <i>Asset management plan covers key requirements.</i></p> <p>The 2013 review report noted the following:</p> <ul style="list-style-type: none"> The AM Branch is replacing Asset Class Plans with Strategic Statements. <p>The 2013 recommendation was for Water Corporation to complete the remaining 17 Strategic Statements.</p>	<p><i>We recommend that Water Corporation complete the remaining Asset Class Strategies, should they be required.</i></p> <p>Since this recommendation was made, Water Corporation has updated its approach to Asset Class Strategy documents as identified in the Guideline (#15763214). Water Corporation has also reviewed the application and coverage of these documents and identified that 12 are required. These strategies are now completed and available on Water Corporation's intranet. We</p>	30/8/2018	No

B. Resolved during current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
	Water Corporation has completed asset class strategies for 15 Asset Class Strategies. The need for the remaining Strategies is currently being reviewed.	reviewed an example Asset Class Strategy as part of this review.		
R17/2013	<p><i>Asset Operations - Staff resources are adequate and staff receive training commensurate with their responsibilities</i></p> <p>The previous review report noted the following:</p> <ul style="list-style-type: none"> While operational data is being captured good quality data is not being captured to support operations. <p>The 2013 recommendation was for Water Corporation to extend current training to provide operators in the field with the importance of data collection, the role they play in asset management and how their job is important to the greater business outcomes.</p> <p>Water Corporation has completed a number of actions related to this recommendation but not all were complete.</p>	<p><i>Water Corporation to complete the extended training by December 2015. Water Corporation to complete review of the detailed data needs for Operations, including data integrity requirements and source system</i></p> <p>Water Corporation did not complete the formal training program included in the recommendation. However, training of operators in the field on the importance of data collection and quality is completed on an ongoing basis through:</p> <ul style="list-style-type: none"> Toolbox presentations by asset teams (who are the end consumers of the data) to operational teams to emphasize the importance of good quality data to underpin decisions. This has been contextualized for local asset management decisions. Discussions at daily team meetings. 	31/12/2015	No
R7/2013 and R20/2013	<p><i>Asset Operations - Operational policies and procedures are documented and linked to service levels required.</i></p> <p>The 2013 review report noted the following:</p> <ul style="list-style-type: none"> SCADA (Supervisory control and data acquisition) data is collected, however a plan is needed that guides the use of this data for planning purposes. <p>The 2013 recommendation was for Water Corporation to develop a plan on how to utilise SCADA data for all asset classes, e.g. Data to be used, what purpose and what asset class and to incorporate the use of the Data Historian within the plan.</p>	<p><i>We recommend that Water Corporation implement the SCADA Data Standards into its business processes, prioritised by business value.</i></p> <p>Water Corporation has now prepared Asset Data Requirements Framework (#18099192) under which it has prepared a Dynamic Data Standard the scope of which includes SCADA data.</p>	30/06/2016	No

B. Resolved during current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
R21/2013	<p><i>Asset Maintenance - Maintenance policies and procedures are documented and linked to service levels required</i></p> <p>The 2013 review report noted the following:</p> <ul style="list-style-type: none"> The current documentation process needs to be completed. <p>The 2013 recommendation was for Water Corporation to continue to review and complete process documentation including maintenance standards and procedures.</p>	<p><i>We recommend that Water Corporation update maintenance standards and procedures to reflect the new business structure</i></p> <p>Water Corporation has in place a Maintenance Standard Register (# 825046) which we reviewed as part of this review. Water Corporation has undertaken review and revision of standards so that they reflect changes to the business. The register shows that no standards are overdue for review and update. Water Corporation has progress documents tracking its work to update the maintenance standards since the 2015 review.</p>	31/12/2016	No
R26/2013	<p><i>Asset Maintenance - Failures are analysed and operational / maintenance plans adjusted where necessary.</i></p> <p>The 2013 review report noted the following:</p> <ul style="list-style-type: none"> Fault mode analysis is being applied inconsistently. <p>The 2013 recommendation was for Water Corporation to formalise fault mode analysis and develop guidelines for data requirements and analysis.</p>	<p><i>We recommend that Water Corporation formalises its approach to fault mode analysis and develops guidelines to assist in its application.</i></p> <p>Water Corporation has now prepared a Failure Mode and Effects Analysis (FMEA) and Reliability Centered Maintenance (RCM) guideline (#17201988) which formalizes the business' approach to fault mode analysis.</p>	30/09/2017	No
27/2013	<p>The previous review report noted the following:</p> <ul style="list-style-type: none"> Data is entered into the maintenance management system inconsistently resulting in poor quality supporting data. <p>The 2013 recommendation was for Water Corporation to improve the quality of data being fed back into the work orders by providing documented direction and support for maintenance personnel.</p>	<p><i>Asset Maintenance: Water Corporation should review the detailed data needs for the maintenance process, including data integrity requirements and source system; implement system changes and changes to collection processes where required; develop reports to review and validate the data and KPIs to monitor process compliance; and monitor data on a regular basis and feedback KPIs and non-compliance to field users.</i></p>	31/12/2017	No

B. Resolved during current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
	<p>The actions that Water Corporation developed for completing this recommendation were:</p> <ol style="list-style-type: none"> 1. Review the detailed data needs for the maintenance process, including data integrity requirements and source system. 2. Implement system changes and changes to collection processes where required. 3. Develop reports to review and validate the data and to KPI's monitor process compliance. 4. Monitor data on a regular basis and feedback KPI's and non-compliance to Field Users. <p>However, the original dates for completing these actions were not achieved during the review period.</p>	<p>Water Corporation has developed a set of work order data integrity measures. These measures are defined and documented in #14931516.</p> <p>A process for reporting on and monitoring the work order data integrity measures was also been developed and is documented in #19230012.</p>		
R28/2013	<p>The previous review report noted the following:</p> <ul style="list-style-type: none"> ▪ Good quality data is not being captured to support asset information and analysis. <p>The 2013 recommendation was for Water Corporation to incorporate the data capture as part of planned maintenance and/or inspections as part of normal operations.</p> <p>Although Water Corporation has completed most of the actions associated with this recommendation, it will need to review additional feedback requirements following the actions included in 27/2013.</p>	<p>Water Corporation should incorporate the data capture as part of planned maintenance and/or inspections as part of normal operations.</p> <p>Water Corporation has included data capture as part of normal operations with multiple feedback fields available in the Work Order. The approach to data capture is currently being reviewed with the intent being to introduce new technology which makes it easier for the field crews to improve data quality.</p>	31/12/2017	No
R1/2015	<p><i>B2</i></p> <p><i>Risk Management - The probability and consequence of risk failure are regularly assessed</i></p>	<p><i>We recommend that Water Corporation review its guidance material for the Asset Risk Assessment tool with a group of users (input and end users) to identify any areas of ambiguity in the guidance provided or opportunities for improvement.</i></p>	30/6/2017	No

B. Resolved during current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
	We found that Water Corporation staff take differing approaches to completing asset risk assessments	In response to this recommendation and recommendation R2/2015, Water Corporation has revised its Asset Risk Framework (#15272031) and updated its Asset Risk Assessment Procedure based on feedback from users. It has documented the feedback received (#16705859). Water Corporation prepared an implementation plan (#16261815) to embed the changes to the procedures within the business which include communication across the business. We also comment on the updated approach to asset risk assessment under the Asset planning element.		
R2/2015	<p><i>B2</i></p> <p><i>Risk Management - The probability and consequence of risk failure are regularly assessed</i></p> <p>We found that Water Corporation staff take differing approaches to completing asset risk assessments</p>	<p><i>We recommend that Water Corporation communicates to all users of the Asset Risk Assessment tool its desired approach to scoring the likelihood and consequence of asset risks. That is, whether the risk scorer is to consider business as usual operations, a worst case scenario or some other operating context when undertaking the scoring. This communication should occur after the findings from the previous recommendations are endorsed.</i></p> <p>In response to this recommendation and recommendation R2/2015, Water Corporation has revised its Asset Risk Framework (#15272031) and updated its Asset Risk Assessment Procedure based on feedback from users. It has documented the feedback received (#16705859). Water Corporation prepared an implementation plan (#16261815) to embed the changes to the procedures within the business which include communication across the business. We also comment on the updated approach to asset risk assessment under the Asset planning element.</p>	30/6/2017	No

B. Resolved during current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
R3/2015	<p>B2 <i>Risk Management - The probability and consequence of risk failure are regularly assessed</i></p> <p>We found that a number of risk rated as “high” in the System Risk Assessment tool had not been reviewed and endorsed in the desired timeframe</p>	<p><i>We recommend that Water Corporation reviews all existing System Risks to identify high risks that are overdue for review and/or endorsement and completes the scheduled review and/or endorsement of the risks.</i></p> <p>In addressing this recommendation, Water Corporation divided the risks into metro and regional risks. It has undertaken review of extreme and high risks and documented these in the evidence provided (#15880387, #17172891). At the review meeting we ran reports from the Business Reporting System and found that there were no risks overdue for review as at 30 June 2018.</p>	31/03/2017	No
R4/2015	<p>B2 <i>Risk Management - The probability and consequence of risk failure are regularly assessed</i></p> <p>We found that a number of risk rated as “high” in the System Risk Assessment tool had not been reviewed and endorsed in the desired timeframe</p>	<p><i>We recommend that Water Corporation reviews the review and endorsement process (activities and timing) for system risks to confirm if the current approach is appropriate for its business needs and implements any changes that it determines are necessary</i></p> <p>Water Corporation has developed a report on System Capability Matric risks for reporting (#16971109). At the review meeting we ran reports from the Business Reporting System and found that there were no risks overdue for review as at 30 June 2018.</p>	31/3/2017	No
R6/2015	<p>A1 <i>Capital Expenditure Planning - The plan provides reasons for capital expenditure and timing of expenditure</i></p> <p>We noted during the site visit to Newman that Water Corporation's sewer access chamber covers are not</p>	<p><i>We recommend that Water Corporation reviews its capitalisation policy to confirm whether the access chamber lids should be treated as capital assets.</i></p>	31/03/16	No

B. Resolved during current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
	capitalised assets. This policy differentiates from numerous other Australian water businesses, where the covers are considered to be capital expenditure items. We also note that some of the work to replace the lids has involved construction work to alter the size of the chamber due to it being covered and needing to be raised back to ground level.	Water Corporation referred this recommendation to its asset accounting team. The asset accounting team responded that it was comfortable with the existing approach to capitalisation of work on access chambers. This is documented in email (#14229770).		
R7/2015	<p>A1</p> <p><i>Review of AMS - A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current</i></p> <p>During the discussions for the Review of the AMS section, there was uncertainty relating to whether Water Corporation has a Correction Action Register (CAR) system that is used to record deficiencies and improvements recommendations/opportunities so that actioning them can be managed, with reminders automatically sent out to the responsible officers and escalation if they are not completed within the set timeframes.</p>	<p><i>We recommend that Water Corporation reviews this to confirm whether it has a corporate CAR system and, if not, looks to implement such a system.</i></p> <p>In response to this recommendation, Water Corporation has confirmed that the Sentinel system is used for tracking corrective actions related to the asset management system. This is documented in the Asset Management System manual (#14247282). The manual notes that actions may arise from activities such as internal audits and the external Asset Management System Effectiveness Reviews. At the review meetings, we the sentinel system was demonstrated. We ran a system report (filter) to identify the tracking of the actions arising from the 2015 Asset Management System Effectiveness Review.</p>	30/06/16	No

C. Unresolved at end of current review period				
Reference (no./year)	(Asset management effectiveness rating / Asset Management System Component & Criteria / details of the issue)	Auditor's recommendation or action undertaken	Date resolved	Further action required (Yes/No/Not applicable) & details of further action required including current recommendation reference if applicable
R5/2015	<p>B3 <i>Contingency Planning - Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks</i></p> <p>We were unable to conclude that Water Corporation has adequately identified the highest operational risks to its business and undertaken contingency planning to address them. This is because contingency planning has been undertaken inconsistently across the business</p>	<p><i>We recommend that Water Corporation identifies for its operations the desired:</i></p> <ul style="list-style-type: none"> <i>a) level of application</i> <i>b) coverage and</i> <i>c) contents of contingency plans,</i> <p><i>and implements contingency planning consistently using these criteria through a program of activity.</i></p> <p>In response to this recommendation, Water Corporation has developed S498 Operational Contingency Planning Standard (#14812496) and Contingency Planning - development, testing and Review Procedure (#15108780). These are supported by a template and a Framework for Critical Assets (#16898644). These actions address the parts of the recommendation to identify the level of application, coverage and contents of contingency plans.</p> <p>Water Corporation has documented the contingency plans that it has prepared under this revised approach (#17048523) and we reviewed a sample of contingency plans at our review meetings. Water Corporation also provided an exercise and test program for 2018. Only a small number of plans have been tested to date. This recommendation has therefore been left open as consistent implementation is supported by testing and refinement of the plans.</p> <p>Also refer to discussion under the Contingency Planning element.</p>	N/a	<p>Yes</p> <p>We recommend that Water Corporation continues its program of testing contingency plans so that all plan are tested in a reasonable period of time (set by Water Corporation) and that the outcomes of the testing are documented and updates to the plans arising from the lessons learned are actioned.</p>

4 Performance Summary

4.1 Assessment Rating Scales

In accordance with the Audit and Review Guidelines, the asset management system effectiveness of Water Corporation was assessed using the rating scales in Table 4-1 and Table 4-2.

Table 4-1 Asset Management Process and Policy Definition Adequacy Rating

Rating	Description	Criteria
A	Adequately defined	<ul style="list-style-type: none"> Processes and policies are documented. Processes and policies adequately document the required performance of the assets. Processes and policies are subject to regular reviews, and updated where necessary. The asset management information system(s) are adequate in relation to the assets that are being managed.
B	Requires some improvement	<ul style="list-style-type: none"> Process and policy documentation requires improvement. Processes and policies do not adequately document the required performance of the assets. Reviews of processes and policies are not conducted regularly enough. The asset management information system(s) require minor improvements (taking into consideration the assets that are being managed).
C	Requires significant improvement	<ul style="list-style-type: none"> Process and policy documentation is incomplete or requires significant improvement. Processes and policies do not document the required performance of the assets. Processes and policies are significantly out of date. The asset management information system(s) require significant improvements (taking into consideration the assets that are being managed).
D	Inadequate	<ul style="list-style-type: none"> Processes and policies are not documented. The asset management information system(s) is not fit for purpose (taking into consideration the assets that are being managed).

Table 4-2 Asset Management Performance Ratings

Rating	Description	Criteria
1	Performing effectively	<ul style="list-style-type: none"> The performance of the process meets or exceeds the required levels of performance. Process effectiveness is regularly assessed, and corrective action taken where necessary.
2	Opportunity for improvement	<ul style="list-style-type: none"> The performance of the process requires some improvement to meet the required level. Process effectiveness reviews are not performed regularly enough. Process improvement opportunities are not actioned.
3	Corrective action required	<ul style="list-style-type: none"> The performance of the process requires significant improvement to meet the required level. Process effectiveness reviews are performed irregularly, or not at all. Process improvement opportunities are not actioned.
4	Serious action required	<ul style="list-style-type: none"> Process is not performed, or the performance is so poor that the process is considered to be ineffective.

4.2 Asset Management Review Effectiveness Summary

The asset management system review assessed the effectiveness of the asset management system in delivering the services as required under the operating licence.

The review was conducted utilising the asset management adequacy and performance ratings as outlined in the Audit Review Guidelines. A summary of the outcomes of the review is provided in Table 4-3.

Based on our asset management system review observations and findings, we consider that the adequacy and performance of the licensee's system meets a level appropriate for the licensee, given the size, asset base and risks associated with the services that it is licenced to provide. The ratings awarded reflect that Water Corporation has well developed asset management policies and processes, which in some areas are leading amongst Australian water utilities.

Since the 2015 Review, Water Corporation has undertaken significant work to build on its existing asset management system and align the system with the requirements of the international standard for a management system for asset management, ISO55001:2014. The effort invested by Water Corporation is reflected in that an A1 process and performance ratings has been assigned to most criteria.

Table 4-3 Asset Management Review Effectiveness Summary

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
Asset planning	A	1
▪ Asset management plan covers key requirements	A	1
▪ Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning	A	1
▪ Service levels are defined	A	1
▪ Non-asset options (e.g. demand management) are considered	A	1
▪ Lifecycle costs of owning and operating assets are assessed	A	1
▪ Funding options are evaluated	A	1
▪ Costs are justified and cost drivers identified	A	1
▪ Likelihood and consequences of asset failure are predicted	A	1
▪ Plans are regularly reviewed and updated	A	1
Asset creation/acquisition	A	1
▪ Full project evaluations are undertaken for new assets	A	1
▪ Evaluations include all life-cycle costs	A	1
▪ Projects reflect sound engineering and business decisions	A	1
▪ Commissioning tests are documented and completed	A	1
▪ Ongoing legal / environmental / safety obligations of the asset owner are assigned and understood	A	1
Asset disposal	A	1
▪ Under-utilised and under-performing assets are identified as part of a regular systematic review process	A	1
▪ The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken	A	1
▪ Disposal alternatives are evaluated	A	1
▪ There is a replacement strategy for assets	A	1
Environmental analysis	A	2
▪ Opportunities and threats in the system environment are assessed	A	1

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
<ul style="list-style-type: none"> Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved 	A	1
<ul style="list-style-type: none"> Compliance with statutory and regulatory requirements 	A	2
<ul style="list-style-type: none"> Achievement of customer service levels 	A	1
Asset operations	A	1
<ul style="list-style-type: none"> Operational policies and procedures are documented and linked to service levels required 	A	1
<ul style="list-style-type: none"> Risk management is applied to prioritise operations tasks 	A	1
<ul style="list-style-type: none"> Assets are documented in an Asset Register including asset type, location, material, plans of components, an assessment of assets' physical/structural condition and accounting data 	A	1
<ul style="list-style-type: none"> Operational costs are measured and monitored 	A	1
<ul style="list-style-type: none"> Staff resources are adequate and staff receive training commensurate with their responsibilities 	A	1
Asset maintenance	A	1
<ul style="list-style-type: none"> Maintenance policies and procedures are documented and linked to service levels required 	A	1
<ul style="list-style-type: none"> Regular inspections are undertaken of asset performance and condition 	A	1
<ul style="list-style-type: none"> Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule 	A	1
<ul style="list-style-type: none"> Failures are analysed and operational / maintenance plans adjusted where necessary 	A	1
<ul style="list-style-type: none"> Risk management is applied to prioritise maintenance tasks 	A	1
<ul style="list-style-type: none"> Maintenance costs are measured and monitored 	A	1
Asset management information system	A	1
<ul style="list-style-type: none"> Adequate system documentation for users and IT operators 	A	1
<ul style="list-style-type: none"> Input controls include appropriate verification and validation of data entered into the system 	A	2
<ul style="list-style-type: none"> Logical security access controls appear adequate, such as passwords 	A	1
<ul style="list-style-type: none"> Physical security access controls appear adequate 	A	1
<ul style="list-style-type: none"> Data backup procedures appear adequate and backups are tested 	A	1
<ul style="list-style-type: none"> Key computations related to licensee performance reporting are materially accurate 	A	1
<ul style="list-style-type: none"> Management reports appear adequate for the licensee to monitor licence obligations 	A	1
Risk management	A	1
<ul style="list-style-type: none"> Risk management policies and procedures exist and are being applied to minimise internal and external risks associated with the asset management system 	A	1

Asset Management System Component	Asset management process and policy definition adequacy rating	Asset management performance rating
<ul style="list-style-type: none"> Risks are documented in a risk register and treatment plans are actioned and monitored 	A	1
<ul style="list-style-type: none"> The probability and consequence of risk failure are regularly assessed 	A	1
Contingency planning	A	2
<ul style="list-style-type: none"> Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks 	A	2
Financial planning	A	1
<ul style="list-style-type: none"> The financial plan states the financial objectives and strategies and actions to achieve the objectives 	A	1
<ul style="list-style-type: none"> The financial plan identifies the source of funds for capital expenditure and recurrent costs 	A	1
<ul style="list-style-type: none"> The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets) 	A	1
<ul style="list-style-type: none"> The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period 	A	1
<ul style="list-style-type: none"> The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services 	A	1
<ul style="list-style-type: none"> Significant variances in actual / budget income and expenses are identified and corrective action taken where necessary 	A	1
Capital expenditure planning	A	1
<ul style="list-style-type: none"> There is a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates 	A	1
<ul style="list-style-type: none"> The plan provides reasons for capital expenditure and timing of expenditure 	A	1
<ul style="list-style-type: none"> The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan 	A	1
<ul style="list-style-type: none"> There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned 	A	1
Review of AMS	A	1
<ul style="list-style-type: none"> A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current 	A	1
<ul style="list-style-type: none"> Independent reviews (e.g., internal audit) are performed of the asset management system 	A	1

5 Asset Management System Review Observations and Recommendations

The following tables provide detailed commentary based on the findings observed during the audit process.

5.1 Asset planning

Table 5-1 Asset Management System Review Observations for Asset Planning

Effectiveness Criteria	Observations	Evidence reviewed
Asset Planning		
<ul style="list-style-type: none"> Asset management plan covers key requirements 	<p>Summary</p> <ul style="list-style-type: none"> We consider that Water Corporation has in place a robust asset management system that covers the relevant requirements for achieving its corporate and asset management objectives. Water Corporation has made a step change in its approach to asset management since the 2015 Asset Management System Effectiveness Review. The following sub-headings provide an outline of the key elements of Water Corporation's Plan Assets Framework. The framework describes how top down corporate objectives in the Statement of Corporate Intent (SCI) and Strategic Development Plan (SDP) inform asset management policy and strategy resulting in agreed levels of service (LoS). These drive planning, decision-making, and performance monitoring within the parameters of asset management competencies, risks, opportunities, resources, processes and tools. In addressing that the asset management plan covers key requirements, we have provided observations on a number of key documents: <ul style="list-style-type: none"> An overview of Water Corporation's Asset Planning Asset Management Policy Key asset management documents Long-term planning Asset Management Strategy Asset Class Strategies Asset Class Plans Scheme planning Asset values Asset Deficiency Register Asset management future 	<ul style="list-style-type: none"> Asset Management Strategy 2018-2038 (version date April 2018) (# 20186938) Strategic Asset Plan 2018-19 (# 17930187) Planning Reports List 2015-18 #20264709 Plan Assets Manual #19747720, June 2018 Manage Asset Condition Guideline (# 8717283) (version date 11 September 2018) Asset Class Strategy Guideline #15763214, 02 August 2018 Asset Risk Framework, ## 15272031, Dated 26 April 2018 Plan Assets Framework #15643272 13 September 2018 Water Reticulation Asset Class Strategy #17385747 Operations and Maintenance Planned Activities Business Case 2018-19 #19353443, 29 May 2018 S-CL-CV-2018 Gravity Sewer Asset Class Plan (ACP) #19375983

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Overview of Water Corporation's Asset Planning</p> <ul style="list-style-type: none"> There have been no major changes in the process used by Water Corporation for its asset management planning since the last review in 2015. Water Corporation considers that the biggest change has been the development of the Asset Management Strategy to replace the previous Strategic Asset Management Plan (SAMP). The change in documentation has allowed for a greater level of clarity over the overall asset management, in particular the line of sight through the Corporation's documentation and processes back to the overall objectives and level of service requirements. The overarching asset management framework is provided in the Plan Assets Framework. This outlines Water Corporation's overall 'Plan Assets' process and its relationship to the Corporation's capital and operational decision-making, delivery and infrastructure asset performance monitoring. The framework describes how top down corporate objectives in the Statement of Corporate Intent (SCI) and Strategic Development Plan (SDP) inform asset management policy and strategy resulting in agreed levels of service. These drive planning, decision-making, and performance monitoring within the parameters of asset management competencies, risks, opportunities, resources, processes and tools. <p>Asset Management Policy</p> <ul style="list-style-type: none"> Water Corporation developed a new Asset Management Policy in 2016 and this has been endorsed by the Board. Although it previously had a policy, it was not Board-endorsed. The endorsement reflects the leadership being provided in relation to Water Corporation's asset management activities. Water Corporation has five core asset management objectives outlined in its Asset Management Policy. These are: <ul style="list-style-type: none"> <i>Our assets and services are safe for our employees, customers and community</i> <i>We provide reliable and sustainable water services that meet our customers and the community's needs</i> <i>We are compliant and meet our regulatory commitments</i> <i>We are cost effective and optimise investment decisions considering both operating and capital options</i> <i>We will maintain a mature Asset Management System, suitable for the scale and complexity of our infrastructure asset base.</i> <p>Key asset management documents</p> <ul style="list-style-type: none"> Water Corporation has two key asset management documents, both of which have been developed since the last AM review: <ul style="list-style-type: none"> The Asset Management Strategy provides Water Corporation's overall strategies for a 20 year horizon (currently 2018 to 2038). In addition to the Asset Management Policy, the Strategy sets 	<ul style="list-style-type: none"> Manage Asset Deficiency Work Instruction #19578084 (version date 14 September 2018) Monitor Asset Performance Work Instruction (# 19581781), 14 September 2018 Plan Asset Investigations Work Instruction #19581984 (version date September 2018) One Pathway to Investment Guideline #19993477, 4 July 2018 2018-19 Budget Submission (Operating Budget Pack), Board Meeting, 18 December 2017 Board Memo – Asset Investment Program 2018-19 – 2022-23 Planned Operations and Maintenance Prioritisation Process Guideline #19738138, 4 July 2018 Water Reticulation Asset Class Plan (ACP) (#17982389 - Asset Management Maturity Review - 2017 03 Final v1.2)

Effectiveness Criteria	Observations	Evidence reviewed
	<p>out the Levels of Service, the strategic priorities and the asset management competencies that Water Corporation is looking to develop.</p> <ul style="list-style-type: none"> – The Asset Management System Manual provides the building blocks and the key documentation of the AMS. ▪ The Asset Management Strategy was developed from the previous SAMP. The SAMP did not gain any traction within the Corporation and was not used. Essentially the new Strategy document is a rebrand of the previous SAMP but has allowed Water Corporation to better embed the document within the changes it has made to its asset management activities since the 2015 review. ▪ The changes within Water Corporation since the 2015 review have allowed the new Asset Management Strategy document to be tied in with the day-to-day asset management work undertaken by the Corporation. <p>Long-term planning</p> <ul style="list-style-type: none"> ▪ The 'Water Forever' document (October 2009) forms the over-arching long-term 50 year plan for management of its water sources and delivery of water services to Perth, Mandurah and surrounding communities. This also drives the long-term wastewater planning for these areas. The Water Forever plan assesses growth predictions in the areas and looks at the impact of climate change on the supply demand water balance and the different water sources used for supply, using information provided by CSIRO (Commonwealth Scientific and Industrial Research Organisation). ▪ Long-term strategic planning has also been completed for the Southwest and Great Southern areas. Long-term strategic planning for the northern and northwest regions was carried out during 2007-2014 as a result of the mining boom in these areas. A review of the asset bases for Water and Wastewater is listed in the Asset Management Strategy. Assessment of service levels against key risks noting key critical assets has been documented. Based on Cardno's assessment of the documentation and the interviews with Water Corporation's personnel, this appears sound. ▪ Water Corporation also has a 'Water Forever - Whatever the Weather' plan that addresses a 10-year plan for Western Australia which outlines the current state of its water supplies and wastewater systems, and the drivers of future demand in each region. It also discusses options for future new sources. ▪ Since 2016, Water Corporation has a Water and Wastewater Demand Forecasting Framework. It is considered by Water Corporation as a key enabler of strategic asset management and asset management planning. Demand Analysis was covered in an asset maturity assessment conducted by AMCL (Asset Management Consulting Limited) and reported as a key strength with a maturity score of 2.7 out of 3. ▪ Water Corporation's scheme planning looks at a 15 – 20 year horizon and is used to assess specific schemes within the regions and management of the source, distribution and reticulation assets. The water supply demand balance is analysed in greater detail in conjunction with the operation and management of the scheme's assets. This includes development of capital and operating expenditure, with capex projects being considered for inclusion in the capital program. Water Corporation has completed scheme planning for each of its schemes. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> ▪ Asset planning is aligned to its five year Strategic Development Plan (a draft Plan has been prepared for the 2016-2017 to 2020-2021 period), and annual Statement of Corporate Intent and Corporate Risk Report. Water Corporation's Strategic Asset Plan for 2018-19 now covers two five year periods – 2018-19 to 2022-23 and 2023-24 to 2027-28. ▪ The One Pathway to Investment Guideline outlines the steps completed for preparatory works required ahead of requests for capital or operational funding to solve a problem reactively or proactively. ▪ The Asset Management Strategy lays out the asset planning principles and processes which have been used to develop the next 20 year program for Water, Wastewater and Drainage assets. <p>Asset Management Strategy</p> <ul style="list-style-type: none"> ▪ The Asset Management Strategy pulls together the scope of the AMS, including the objective and the Levels of Service. Outcome statements are provided under each of the objectives and set out how the objectives have been developed from the customer requirements. These have been fine-tuned to put them into a water/wastewater/drainage context and to articulate the measures that Water Corporation needs to achieve in order to meet the targets that have been set. ▪ Within Water Corporation's asset management framework, the asset planning documents sit under the Asset Management Strategy. This includes the Strategic Investment Business Cases which underpin the formulation of the five year Asset Investment Program. The Investment Governance Committee provides assurance regarding the development of the Asset Management System and the formulation, prioritisation and delivery of the Asset Investment Program. ▪ The Asset Management Strategy: <ul style="list-style-type: none"> – outlines a 20 year plan that provides a long-term outlook and the proposed investment priorities and the Corporation's long term strategic approach. – describes the line of sight that exists between the asset management system objectives and products, service chain elements and capital investment categories. – includes a scan of the Water Corporation working environment, assessing demand and capability of assets. – outlines the Investment Decision Framework, its various levels and the different approaches used. – outlines the asset management objectives which are framed around safety, reliability, compliance and cost effectiveness. – Sets out the Levels of Service – provides asset summaries and service level performance summaries that highlight areas of poorer and better performance. In addition the asset investment summaries include forecast investment profiles. – lists critical assets based on the portfolio risks relevant to Water, Wastewater and Drainage. – lists key challenges for each portfolio 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> documents the key enablers of the Asset Management Strategy and provides details of the Continuous Improvement actions that have been identified. <p>Asset Class Strategies</p> <ul style="list-style-type: none"> Water Corporation develops Asset Class Strategies for specific classes of assets (e.g. water mains, or wastewater pump stations). These are prepared using a standard template to provide a one page summary that is aligned with the Asset management Strategy and the required Levels of Service to report how the asset class is performing. An Asset Class Strategy Guideline document has been provided which outlines the design, principles, and prioritisation of asset class strategies. Their key role is for Asset Investment Planning teams to use them to develop Asset Class Plans. The guideline includes regulatory, ISO 550001 and the Institute of Asset Management competency requirements. Asset Management objectives are stated (as per the Asset Management Policy). A matrix is used to prioritise different Levels of Service. Principles are listed and a standard template is also provided. The document concludes with sections on governance and continuous improvement. The Asset Class Strategies' accountability and responsibility resides with the Asset Management System and Risk Section, Asset Strategy Business Unit, APG. Water Corporation has completed all 12 of the Asset Class Strategies that it identified as being required. The Water Reticulation and Gravity Sewer Network Asset Class Strategies were reviewed during the review. The Asset Class Plans detail the approach required to ensure compliance with the targets set in the Asset Class Strategy. This then informs the operational and capital programs required. Sections include asset class information and challenges, current and desired performance, lifecycle optimisation, budget summaries and improvement opportunities. The Asset Class Strategies outline contextual information, and provide an overview of the asset inventory, key characteristics of the cohort (such as age, material, condition), target, actual and predicted performance. They also provide Water Corporation with decision criteria and planning triggers to inform more detailed asset management plans which outline the specific renewal, maintenance and investigation activities required to deliver the asset class strategy. <p>Asset Class Plans</p> <ul style="list-style-type: none"> Water Corporation's Asset Class Strategies are supported by Asset Class Plans. The Asset Class Plans are intended to document the specific activities, resources and time scales required to achieve Water Corporation's asset management objectives for the corresponding strategy. This then informs the operational and capital programs required. However, the Asset Management Strategy notes that no Asset Class Plans have been published at present Asset Class Plans have been provided for Gravity Sewer Network and Water Reticulation. Sections include asset class information and challenges, current and desired performance, lifecycle optimisation, budget summaries and improvement opportunities. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> The Asset Management Strategy includes completing the Asset Class Plans in the section on Continuous Improvement and Review; however, no details of the Asset Class Plans to be developed or the proposed timeframes to complete them is included in the document. <p><u>Recommendation R1/2018</u></p> <ul style="list-style-type: none"> We recommend that Water Corporation modifies the Summary of Improvement Opportunities include in the Asset Management Strategy to include due dates and accountabilities for each of the identified improvements. <p>Scheme Planning</p> <ul style="list-style-type: none"> Specific geographic strategies are also outlined in the Asset Management Strategy. These consider the whole of the water cycle and include community engagement as part of their development. Scheme Planning is summarised in the Asset Management Strategy. This is split into planning for the Metropolitan Water Sources and planning for all other schemes. Water Corporation prepares a bi-annual summary of water supply security for the IWSS which customers in Perth, the Goldfields, Agricultural and South West regions. The IWSS supply security position is reviewed in June and October of each year. The published report is provided to the Water Supply and Demand Governance Committee and discussed with the Minister for Water and the Department of Water and Environmental Regulation to support a shared understanding of this key level of service. For the water, wastewater and drainage schemes, Water Corporation assesses the current performance and the performance in the last five years in order to develop ratings that are used to measure the performance against the overall asset management objectives and required levels of service. This is used to provide a high level summary of areas where Water Corporation needs to provide focus (Table 12 in the Asset Management Strategy). Water Corporation's Water Asset Portfolio is supported by detailed asset analysis on performance trends, insights and recommendations. This is provided in the Asset Management Strategy Analysis of Correct Performance. The performance results are reported via Water Corporation's dashboard reporting system. <p>Asset Values</p> <ul style="list-style-type: none"> The replacement value of all of Water Corporation's assets is in the region of \$37B. Its water assets make up 54% of this and its wastewater assets a further 39%. The remainder of the replacement costs are for drainage, irrigation, and other assets. The written down value of Water Corporation's assets is \$23B. Water Corporation's asset base is relatively young with 77 per cent of its asset value being less than 60 per cent through its economic asset life. Conversely, only about 9 per cent of Water Corporation's asset value is more than 90 per cent through its economic asset life. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Water Corporation has developed renewals forecasts for each of its asset portfolios based on asset lives in the Corporation's Financial Fixed Asset Register. This information is considered to represent an 'upper bound' indicator of renewal expenditure required to meet level of service outcomes. <p>Asset Deficiency Register</p> <ul style="list-style-type: none"> Water Corporation has a state-wide asset deficiency register that it has developed using a bottom-up process based on the issues that have been identified and the work required to rectify them. The process is described in the Manage Asset Deficiency Work Instruction. Water Corporation identifies deficiencies either reactively by operational or other staff, or proactively via its Asset Performance Monitoring process, and these are recorded, managed and documented for further assessment in the Asset Investigation Process. The process of investigating the efficiencies provides transparency regarding the issues, the planning work to rectify them and any feedback from within the Corporation as the Register is able to be viewed by all relevant staff. By developing a single repository of asset deficiencies, Water Corporation considers that it has cut down on duplication and wasted effort from different staff and groups working in isolation on the same issue. It also helps to identify asset failure trends. Solutions to the asset deficiencies can be operational or capital expenditure projects. These are recorded in the Work Program field in the Asset Deficiency Register via a drop-down list of options. Comments can also be added to the Register to record work carried out. Water Corporation's performance dashboard is used daily across the business to identify issues and potential entries to be added to the Asset Deficiency Register. <p>Asset Management Future</p> <ul style="list-style-type: none"> One major challenge that Water Corporation is addressing is aligning its asset management principles to the different standards and requirements that it needs to be aligned to, e.g. ISO55001, the ERAWA licence requirements and the Department of Treasury strategic asset management framework. Water Corporation is developing an approach to work towards achieving certification against the requirements of the asset management system standard ISO55001:2014. 	
<ul style="list-style-type: none"> Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation and interviews with key staff, we consider that Water Corporation's planning process and objectives reflect the needs of all stakeholders and is integrated with business planning. We have recorded our observations below under the following sub-headings: <ul style="list-style-type: none"> Asset investment planning Stakeholder Engagement in Asset Planning Service demand requirements 	<ul style="list-style-type: none"> Asset Management Strategy 2018-2038 (version date April 2018) (# 20186938) S-CL-CV-2018 Gravity Sewer Asset Class Plan (ACP) #19375983 Pinjarra WW Planning - Technical Advice, #15768211, February 2017

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – ‘Tap In’ community engagement program – Customer satisfaction surveys <p>Asset Investment Planning</p> <ul style="list-style-type: none"> ▪ Water Corporation has a four stage approach to its Asset Investment Plan which covers Scoping, Conceptual Options, Detailed Options, and Documentation. There has been an update of the previous process since the last review, with a new template and procedure. Under the new process, more accountability is taken by the Asset Manager as opposed to a recommendation being put forwards for consideration during the development of the capital budget. ▪ Water Corporation engage with the key internal and external stakeholders within the four key stages of the development of the Investment Plan. Through Water Corporation’s improved line of sight, the Asset Investment Plan is aligned back to the asset management objectives. ▪ Capital planning and operations & maintenance (O&M) planning is carried out within the same team as a result of the 2015 restructure of the organisation that was taking place at the time of the last asset management review. This has provided Water Corporation with an improved overview of the total operating costs associated with asset options being included in its forward planning. This has also resulted in an improvement in the project prioritisation processes. ▪ Technical advice to evaluate the background and scope is undertaken if required as part of the planning process. ▪ Discounted cash flow (DCF) or Net Present Value (NPV) assessment is included in Water Corporation’s options analysis. The outputs are used to provide additional information in deciding the preferred option and Water Corporation does not necessarily propose the cheapest option as this may not be the lowest cost option. ▪ Water Corporation uses a degree of digression with regard to base asset capital (renewals) and enhancement projects. Additional analysis is completed to understand whether the preferred option is financially justified and able to be completed in the proposed project timeframe. The associated risks are considered as part of this assessment ▪ Project proposals are progressed through a Gateway process within the four-stage Asset Investment Plan process. ▪ The Water Portfolio Asset Investment Summaries for the metro and regional areas are set out in the Asset Management Strategy. The Asset Investment Summaries for the wastewater portfolios are similarly set out. These provide line of sight between the Asset Management Objectives and the investment programs and projects that are either committed to meet the required levels of service or where further work is required to develop the program for the future. The summaries are broken down to show the proposed investment for Years 1 to 4, Years 5 to 10 and Years 11 to 20. Investments for drainage assets are also included separately in the Asset Management Strategy. ▪ The Infrastructure Markets group looks at alternative funding options for Water Corporation’s capital program, including Public–private partnerships (PPP) and insource/outsource options. The group looks at specific capital projects and also potential ideas for research and development programs. Current case studies being assessed include R&D projects for solar power and biosolids 	<ul style="list-style-type: none"> ▪ Water and Wastewater Demand Forecasting Framework #14708067, 31 March 2017 ▪ Index of Water and Wastewater Demand Forecasts #14951303 ▪ Demand Analysis Increase in Maturity Report #18679560, March 2018

Effectiveness Criteria	Observations	Evidence reviewed
	<p>management and funding options for potential new water sources and wastewater treatment projects. The Asset Planning group meet monthly with the Infrastructure Markets so each group has visibility over the projects.</p> <p>Stakeholder Engagement in Asset Planning</p> <ul style="list-style-type: none"> Planning process and objectives reflect the needs of all stakeholders and are integrated with business planning. The Corporate Stakeholder Strategy outlines how it manages corporate stakeholders, with each organisation prioritised according to their impact or opportunity to generate value, and assigned a Relationship Manager. Each Relationship Manager needs to understand key challenges, successes, and opportunities within the relationship and work with the related people and processes within the AMS (where appropriate) to ensure that the subsequent identified actions are implemented. The highest stakeholder priorities agreed by Executive are set out in the Asset Management Strategy as being: <ul style="list-style-type: none"> Collaboratively driving Perth's transition to a water sensitive city Aligning with and delivering on Government priorities and initiatives Avoiding short term budget cuts and leveraging long term economic reform Engaging strategically on IWSS water supply planning. All regulators impacting the Corporation are managed as corporate stakeholders in accordance with Water Corporation's Corporate Compliance Framework and the Legislation Register which documents its legal and regulatory obligations and the measures in place to ensure compliance. The 'Tap In' engagement program that Water Corporation has conducted is being used to identify priorities for Water Corporation's customers and community groups. Water Corporation's Asset Management Strategy also summarises an Environment Scan that has been undertaken to assess issues at global, national and state levels impacting on the Corporation. <p>Service demand requirements</p> <ul style="list-style-type: none"> Water Corporation closely monitors actual growth rates are against the forecast and adjusts the proposed investments accordingly. Lower forecast population growth across regional areas in recent years, together with reviews of sizing and non-capital solutions, has resulted in Water Corporation cancelling, staging and deferring some planned asset investments, while still having the capacity to facilitate growth as required. <p>'Tap In' community engagement program</p> <ul style="list-style-type: none"> 'Tap In' is an extensive community engagement and customer research program that Water Corporation carried out over an 18 month period. The work involved focus groups and workshops with customers, targeted work and analysis. The program was finished in May 2018. In total, 7,500 	

Effectiveness Criteria	Observations	Evidence reviewed
	<p>customers across the state were directly involved in the consultation and a further 14,500 customers engaged through the online portal. The information gathered through the engagement program has been used by Water Corporation to develop guiding customer service principles.</p> <ul style="list-style-type: none"> ▪ The 'Tap In' engagement program was developed and run by a specialist research firm that was engaged by Water Corporation. Water Corporation has a Customer Advisory Committee that reports the Board that provided overview and input to the program. ▪ The key principles that have been developed from the 'Tap In' program include: <ul style="list-style-type: none"> – <i>Safe and reliable services</i> – <i>Keeping costs down and providing value for money</i> – <i>Protecting the environment</i> – <i>Innovation</i> – <i>Minimising water use</i> – <i>Providing water to sustain liveability, grow and invest</i> – <i>Education and community literacy</i> – <i>Keep customers in the loop</i> <p>Customer satisfaction</p> <ul style="list-style-type: none"> ▪ Water Corporation's ongoing customer satisfaction surveys show an upward trend, reaching an all-time high in June 2018. ▪ The results of the 2018 external stakeholder engagement survey show improvements since the 2016 survey. 	
<ul style="list-style-type: none"> ▪ Service levels are defined 	<p>Summary</p> <ul style="list-style-type: none"> ▪ We consider that Water Corporation has defined and documented service levels that support it in achieving its asset management objectives and corporate objectives. Although some performance measures do not have set targets to be achieved, current performance is measured and trended against each of the Corporation's asset management objectives to assess whether the performance is stable or declining. Performance measures currently without set targets are being prioritised. <p>Overview of service levels</p> <ul style="list-style-type: none"> ▪ The Asset Owner Measures section in the Asset Management Strategy outline the service levels required to achieve the asset management objectives. All measures roll-up and link to Water Corporation's asset management objectives. For each portfolio (Water, Wastewater, Drainage) level of service performance is considered on an annual and longer term (5-year basis). ▪ Water Corporation has established an Asset Performance Framework that outlines the service levels required to achieve Water Corporation's Asset Management Objectives, which in turn meet 	<ul style="list-style-type: none"> ▪ Asset Management Strategy 2018-2038 (version date April 2018) (#20186938) ▪ S-CL-CV-2018 Gravity Sewer Asset Class Plan (ACP) #19375983 ▪ Plan Assets Framework #15643272 13 September 2018 ▪ Manage Asset Condition Guideline #8717281 ▪ Index of Water and Wastewater Demand Forecasts #14951303 ▪ Water Reticulation Asset Class Strategy #17385747

Effectiveness Criteria	Observations	Evidence reviewed
	<p>customer, regulatory and stakeholder outcomes. These outcomes, measures, service levels, current and targeted performance are summarised in the Asset Management Strategy.</p> <ul style="list-style-type: none"> Performance in 2016-17 for each level of service was assessed against the target level of performance (where set) according to criteria that determines whether the performance has been improving, remained stable or declined in the current year based on the past four year average. As noted in the previous dot point, some performance measures currently do not have set target levels. These include: <ul style="list-style-type: none"> Number of localities with 'extreme' DWQ risk: Health (pathogens/naegleria) Regional water schemes supply security Aesthetic water quality – number of localities with exception Operating costs (\$/kL) Energy use (kWh/kL) Total number of wastewater incidents reported to DWER and DoH Wastewater treatment plants with capacity to meet growth for next 5 years Total number of sewer overflows reported to DWER Wastewater treatment plants forecast to exceed licence capacity in 5 years Operating cost / property Percentage of drainage districts with community value opportunities assessed Although these measures do not have set targets to be achieved, current performance is measured and trended against each of the Corporation's asset management objectives to assess whether the performance is stable or declining. Additionally, some performance measures do not have known historical performance trends as these are newer measures that do not have this longer-term data currently available, e.g. Wastewater treatment plants with capacity to meet growth for next 5 years, Wastewater treatment plants forecast to exceed licence capacity in 5 years, Percentage of drainage districts with community value opportunities assessed Water Corporation has assigned a priority to each service level. The highest priority service level measures are those with poorest performance and lowest risk tolerance. Measures with undefined targets or unknown performance are also prioritised. Water Corporation has triggers for renewals built into its systems, e.g. three water main fails in one section of pipe within a certain time flags up the section of pipe as a potential renewals project. Further investigations are completed to confirm whether the pipe should be renewed. 	
<ul style="list-style-type: none"> Non-asset options (e.g. demand management) are considered 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation, provided examples and interviews with key staff, we consider that Water Corporation considers non-asset options during its asset planning activities. The requirements to consider non-asset options are included in the key asset planning documentation (e.g. the Asset Management Strategy). Processes are set out in the relevant work 	<ul style="list-style-type: none"> Asset Management Strategy 2018-2038 (version date April 2018) (# 20186938)

Effectiveness Criteria	Observations	Evidence reviewed
	<p>instruction and the business case templates are set out with different options to be included in project assessments.</p> <p>Overview of non-asset option analysis</p> <ul style="list-style-type: none"> Security of supply and demand management are Water Corporation's two key water portfolio challenges and these are summarised in the Asset Management Strategy document. Other challenges that Water Corporation has identified include operational considerations, water quality and water loss management. Water Corporation considers non-asset solutions including water efficiency. At company level, the Asset Management Strategy describes how demand management through water efficiency will play a significant role in achieving overcoming future water security challenges. Pressure Management is also considered in Water Loss Management section in the same document. The Plan Asset Investigation Work Instruction describes how failures and emerging asset risk are investigated and resolved to ensure the achievement of asset management objectives. The upfront triage investigations can lead to the identification of operational changes or operational/capital investments. The Operations and Maintenance Planned Business Case (decision business case tab) has a section for options to be recorded with supporting commentary. 	<ul style="list-style-type: none"> Plan Asset Investigations Work Instruction #19581984 (version date September 2018) Operations and Maintenance Planned Activities Business Case 2018-19 #19353443, 29 May 2018
<ul style="list-style-type: none"> Lifecycle costs of owning and operating assets are assessed 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation, including specific project and interviews with key staff, we consider that Water Corporation assesses the lifecycle costs of owning and operating asset in its asset planning activities. The requirements of project development are governed by a corporate standard on evaluating investments. Business case templates include sections for costs to be provided and comments made in order to arrive at a preferred option. <p>Overview of lifecycle costs assessments</p> <ul style="list-style-type: none"> Lifecycle costs of owning and operating assets are assessed throughout Water Corporation's asset planning activities. The detail of the cost assessments increases as the planning process progresses. To comply with Water Corporation's Corporate Standard S066 Manage Finance – Evaluate Investments, the Net Present Value (NPV) of all investment and investment options must be calculated and this analysis commences during the Design Alternative Review. If a single Design Alternative cannot be determined, then multiple Design Alternatives may be endorsed for further investigation and this triggers the requirements for the Concept Design process. Within the Asset Class Plans e.g. for Water Reticulation, each Region has a maintenance and renewal review plan which is developed so levels of service performance targets can be achieved. 	<ul style="list-style-type: none"> Strategic Asset Plan 2018-19 (# 17930187) #19375983-S-CL-CV-2018-Gravity Sewer Asset Class Plan (ACP) Newdegate TWS - Planning Review - CW02998 Newdegate Tanks and Retic Booster PS #19816660, August 2018
<ul style="list-style-type: none"> Funding options are evaluated 	<p>Summary</p>	<ul style="list-style-type: none"> Asset Investment Program 2018-19 - 2022-23

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Based on the evidence provided to us and the interviews with key staff, we consider that Water Corporation evaluates funding options during its asset planning activities and the development of its expenditure programs. <p>Overview of evaluating funding options</p> <ul style="list-style-type: none"> Water Corporation's capital and operating budgets are largely defined by the State government. Water Corporation has a variety of funding options available to finance its capital and operational projects. The funding sources include potential for funding from new customers, regional funding sources, contributions from Shire Councils, private funding opportunities and retained profits (net of the dividend to the government). The identification of funding options is dependent on the drivers for the specific project. In the Board Memo – Asset Investment Program 2018-19 to 2022-23, funding of the capital budget is explored in its own section. The capital program is broken down by amount funded by new borrowings and amount self-funded. The document also refers to exploration of new capital funding sources including private investment in new water sources and the National Water Infrastructure Loan Facility. 	
<ul style="list-style-type: none"> Costs are justified and cost drivers identified 	<p>Summary</p> <ul style="list-style-type: none"> We consider that Water Corporation justifies its costs and identifies its cost drivers in its asset planning activities and in the development of projects being put forward for inclusion in its expenditure programs. In arriving at our overall finding for the criteria, we reviewed the key documents in the Plan Assets Framework, including those related to proving strategic asset management direction (e.g. the Asset Management Strategy) and the Asset Investment Planning process. Investment plans for the different products and networks are outlined in the Strategic Investment Business Cases. <p>Asset Investment Planning</p> <ul style="list-style-type: none"> Details of Water Corporation's asset investment planning have been provided above against the 'Planning process and objectives reflect the needs of all stakeholders and is integrated with business planning' criteria. Cost drivers are identified through the development of the planning and the financial analysis completed during the options analysis stage is used in deciding on the preferred option. Water Corporation considers a degree of digression with base asset capital (renewals) and enhancement projects and additional analysis is completed to understand whether the proposed option is financially justified and justified to be completed in the proposed project timeframe. The associated risks are considered as part of this assessment <p>Strategic Investment Business Cases</p>	<ul style="list-style-type: none"> Asset Management Strategy 2018-2038 (version date April 2018) (# 20186938)

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Water Corporation's Strategic Investment Business Cases (SIBCs) outline its 20-year investment plans for key business portfolios, aligned to its products (water, wastewater and drainage) and networks (source, conveyance, reticulation, treatment, reuse, discharge). The SIBCs are used to provide strategic justification for the five-year investment program as well as ten and 20 year views. The asset investment planning process and the SIBC documents provide a clear link between drivers and costs. 	
<ul style="list-style-type: none"> Likelihood and consequences of asset failure are predicted 	<p>Summary</p> <ul style="list-style-type: none"> Water Corporation carry out risk analysis for asset failure based on the likelihood and consequence of failure. The risk management framework is outlined in the text below, with further details provided in Section 5.8 of this report. Our finding is based on a review of key risk management documentation, including the key risk registers, interviews with key staff and evidence provided at scheme site visits. <p>Overview of Water Corporation's asset failure risk analysis</p> <ul style="list-style-type: none"> Water Corporation has a Risk Management Framework which is integral to corporate governance, strategic and business planning processes and optimising operations. One of the key elements of Water Corporation's Risk Management Framework is the Corporate Risk Assessment Criteria which is used as a foundation for asset risk assessment. In addition, Water Corporation uses a Corporate Risk Report as the primary tool for communicating the causes, controls and residual risk assessment for asset risks to Executive and Board. The Board is supported by the Audit and Risk and Risk Management Committees. The Corporation records its asset risk information in the following registers: <ul style="list-style-type: none"> System Risk Assessment (SRA) – a risk register focusing on the risk arising from asset failure at a system level Barrier Risk Assessment (BRA) – a risk register focused on the barriers to maintaining drinking water quality from catchment to tap Dam Safety Risk. The SRA which is the primary asset risk register at a scheme or system level (excluding drinking water quality and dam safety). This register is reported in SCM the risk reporting tool. The BRA used for drinking water quality risks. Risk also informs the prioritisation of planning and selection of both capital and operating investment. The risk tolerance against the objectives and levels of service statements is provided in the Performance Summary included in the Asset Management Strategy document. Specific Water and Wastewater Portfolio risks and ratings are also provided in Water Corporation's Asset Management Strategy document for Metro and Regional operations. Water Corporation's critical assets have been assessed and ranked. Of the 352 identified critical water facilities, Water Corporation has identified 17 as having a consequence level of "Extreme" or 	<ul style="list-style-type: none"> Corporate Risk Management Framework, DocID# 16100952, 18 July 2018 Asset Risk Framework, ## 15272031, 26 April 2018 System Risk Assessment (SRA), ## 2675129, 19 April 2018 Barrier Risk Assessment Manual (Water Quality), # 6959471, 28 May 2017 Dam Safety Strategic Investment Business Case Update (extract), June 2018

Effectiveness Criteria	Observations	Evidence reviewed
	<p>“High” under its Corporate Risk Assessment Criteria. Similarly, Water Corporation has identified that 10 of its 84 critical wastewater facilities have a risk level of “Extreme” or “High”. The availability of an Operating Contingency Plan are summarised in Table 19 of the Asset Management Strategy.</p> <ul style="list-style-type: none"> ▪ Demand forecasting has a major input into Water Corporation’s asset planning. The bi-annual review of the security of supply allows Water Corporation to monitor the changes in performance and risk depending on the winter inflows into the surface sources and recharging of the groundwater sources. <p>Goldfields and Agricultural Region Water Supply Scheme Site Visit</p> <ul style="list-style-type: none"> ▪ Water Corporation has a program of work that has identified through the Asset Investment Program process. The works have been included on the capital program based on the risk assessment that Water Corporation uses for all of its renewals/replacements/maintenance work. The risk event driving the works is a failure of the pipeline and the resulting supply interruption. The work for the Goldfields and Agricultural Region pipeline includes a banding program, pipe replacement and other remediation work at tanks, chlorinators and treatment plants in the region. 	
<ul style="list-style-type: none"> ▪ Plans are regularly reviewed and updated 	<p>Summary</p> <ul style="list-style-type: none"> ▪ We consider that Water Corporation has in place robust document management processes to ensure that its key asset planning documents are regularly review and updated. <p>Overview of Water Corporation’s Plan Review Processes</p> <ul style="list-style-type: none"> ▪ The documents provided for the 2018 review are up to date and in their review cycle (some have dates alone). For Example: <ul style="list-style-type: none"> – Asset Management Strategy 2018-2038 was dated April 2018 – BPS09 Infrastructure Asset Management dated 18 October 2016 and due for review 18 October 2019 – The Asset Risk Framework was reviewed on 26 April 2018 and is next due for review 26 April 2021 – The Plan Assets Framework is dated 13 September 2018 and due for review 30 June 2019. ▪ As noted above, Water Corporation is working towards aligning its asset management with the requirements of ISO 55001 and is updating some of its documentation as part of this. Examples of ISO55001 alignment / referencing in the Asset Planning documentation include: <ul style="list-style-type: none"> – Asset Management Strategy #20186938 – Executive Summary, Investment Decision Framework – Plan Assets Framework #15643272 – reference to asset management system in ISO5501 and asset management landscape alignment – Strategic Asset Plan #17930187 – Asset Management System 	<ul style="list-style-type: none"> ▪ Asset Management Strategy 2018-2038 (version date April 2018) (# 20186938) ▪ BPS09 Infrastructure Asset Management #15729220 dated 18 October 2016 ▪ The Asset Risk Framework #15272031 26 April 2018 ▪ Asset Risk Framework #15272031 26 April 2018 ▪ Plan Assets Framework #15643272 13 September 2018 ▪ Strategic Asset Plan 2018-19 (# 17930187)

5.2 Asset creation and acquisition

Table 5-2 Asset Management System Review Observations for Asset Creation and Acquisition

Effectiveness Criteria	Observations	Evidence reviewed
Asset Creation and Acquisition		
<ul style="list-style-type: none"> Full project evaluations are undertaken for new assets 	<p>Summary</p> <ul style="list-style-type: none"> We believe Water Corporations has adequate policies and procedures in place to undertake full project evaluations for new assets. We have reached our conclusion through a detailed review of the asset creation and acquisition policies and guidelines, the business case process and through a detailed review of the Baandee Pipeline Project to confirm that the processes are carried out in practice for new projects. Further evidence was obtained from observations made during a site visit to the Goldfields and Agricultural Region Water Supply Scheme. Details of our key observations are described in the following sections. <p>Asset Creation and Acquisition Policies and Guidelines</p> <ul style="list-style-type: none"> Water Corporation has in place Project Management Guidelines which sets out processes and milestones where full project evaluations are undertaken. Water Corporation also has an Asset Acquisition Guidelines document for project evaluations for new assets in different phases. The planning and delivery activities completed by each of the Asset Planning and Asset Delivery groups during each phase of the project are included in the Guidelines. Water Corporation acquires assets under its Procurement of Good and Service Policy. The goods and services covered by the policy include the design, supply, installation and construction of capital works. Water Corporation has a supporting Procurement of Good and Services Standard which documents the requirements for procurement and clarifies the intent of the policy. The Standard includes sections on Procurement Planning for Capital Works, as well as approval processes, contract management and administration, sourcing goods, preferred supplier agreements, the evaluation of bids and vendor and contractor performance reporting. The Guideline for Procurement sets out the basic processes to be followed when procuring goods and services. In the Asset Acquisition Guidelines there is a Relationship Diagram which describes the accountabilities framework for the plan and acquire infrastructure assets process. Water Corporation's full project evaluations are conducted in project phases and milestones (in place in the Project Management Guidelines): <ul style="list-style-type: none"> Approval to Scope (ATS) for scoping business case Approval to Delivery (ATD) for delivery business case Project summary confirmation (PSC) for contract 	<ul style="list-style-type: none"> Project Management Guidelines #1376931 10 August 2016 Asset Acquisition Guidelines (PM-#2367933-v12, version dated 29 March 2017) S118 Procurement of Goods and Services #367430, 28 November 2016 PCY112 Delegated Financial and Legal Authorisations #410999, 15 January 2018 PCY216 Procurement of Goods and Services Policy #364850, 31 July 2018 Asset Handover Checklist #606059, 16 February 2017 Project Scoping Business Case #2366894, 27 January 2017 Post Delivery Review Guideline #2367952, 01 May 2018 Fit for Purpose assessment guideline #2718590, 01 May 2018 f Requirements Management Guideline #2720751, 01 May 2018 Project Delivery Business Case - Major Project #3350289, no date External Approvals Manual #6446243, April 2018 Financial Impact Statements Manual #13067700, no date Financial Impact Statement Guidelines #367419, 28 January 2016 S066 Manage Finance – Evaluate Investments #367574, 26 June 2018 BPS09 Infrastructure Asset Management #15729220 dated 18 October 2016

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – Project Practical Completion (PPC) for compliance with design specification and Asset Transfer for asset handover. <p>Business Case Processes</p> <ul style="list-style-type: none"> ▪ Water Corporation uses Business Cases to propose projects for approval and inclusion on the capital program. ▪ A Project Scoping Business Case is used to identify the project and provide an overview of the triggers, drivers and issues and the need for the investment. A Project Delivery Business Case is used to further progress the proposal. ▪ Water Corporation has Guidance Note templates for major and minor projects that includes the instructions, references, guidance and requirements, as well as providing the form for the document. ▪ Mandatory requirements for Water Corporation's Business Cases for Major Projects include: <ul style="list-style-type: none"> – Locality Plan and Schematic Diagrams – Approved Requirements Baseline – Financial Impact Statement – Capital Cost Estimate – Project Schedule – Table of Major Approvals ▪ Procurement Plans for capital works projects form an integral part of Water Corporation's Business Case processes for developing projects and programs that are prepared for capital investment program approval. ▪ The Business Cases set out the procurement details and also the various bundles of work (if more than one) to be performed as part of the project and the funds budgeted. ▪ The Approved Requirements Baseline identifies the project scope requirements and outputs. This is based on technical advice. This is required for Water Corporation's category A, B and C (major) infrastructure projects. Category D is used for minor projects. ▪ Water Corporation's financial delegations are outlined in the Delegated Financial and Legal Authorisations Policy. ▪ A change control process is available to request additional funding if the approved estimate needs to be reviewed. ▪ Cost estimates are based on historic information. Water Corporation maintains a database of previous tenders for the last 15 years. Estimates are developed within specified accuracies as the project progresses. ▪ Project delivery risks are assessed in the preparation of the cost estimates. The Corporate Risk Information System (CHRIS) is used to record risks for all projects. 	<ul style="list-style-type: none"> ▪ Procedure – Transfer of Operational Assets from a Third Party #19421595, 14 June 2018 ▪ Water Front Site for Category ABC Projects #19544546, no date ▪ Guidelines for Procurement #372092, 04 November 2016 ▪ Board Memo – Asset Investment Program 2018-19 – 2022-23

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Project delivery timeframes are based on the historic data that Water Corporation maintains. Project scheduling is completed using Primavera. Water Corporation uses Financial Impact Statements (FIS) to summarise the financial assumptions and implications (i.e. the capital and operating cost impacts) of the recommended option (i.e. the proposed project) that is the subject of the accompanying business case. The FIS is also a critical input into Water Corporation's annual macro operating budget process, as it contains operating and maintenance cost information to assist the Regional and Group Finance Manager ensure sufficient funds are provided in Branch and Region operating budgets. Completion of the engineering phase is achieved when an Approval to Deliver Business Case has been approved. <p>Review of Asset Creation and Acquisition for the Baandee Pipeline Project</p> <ul style="list-style-type: none"> Water Corporation provided the Asset Investment Program in Board Memo Asset Investment Program 2018-19 – 2022-23. It outlines the recommended and target capital budgets for this five-year period, and describes the methodology and constraints through which the overall budget was conceived. As part of the review of Water Corporation's asset creation and acquisition processes, we reviewed the Baandee Pipeline Project in detail. This was one of two projects to each replace 10 km sections of the Goldfields Pipeline that had been identified as being in poor condition in order to reduce the number of bursts and leaks and to improve the reliability of water supply. The second 10 km section of pipe replaced was near Coolgardie. The cost to complete the total 20 km of pipeline was estimated at \$27.5M. The investment reason for the project was 100% base capital for the renewal of the pipe. We reviewed the Approval for Business Case and confirmed the budget estimates and sign-offs. The initial estimate was \$13.932M, including contingency. Design alternatives were considered. These are generally limited for like-for-like replacements, such as this project, but materials, methodology and the pipeline route were considered in the project options. As a result of improved technology, sections of the pipeline are being buried. The original pipe was underground but moved above ground and is now being buried again. We viewed the Detailed Design Report for the pipeline project. The design was completed as part of a joint venture. Water Corporation has a Panel of approved design consultants and the majority of design work is awarded to a company on the panel. Water Corporation's design consultants follow the Engineering Design Manual principles and requirements and any specific Water Corporation technical standards. We reviewed the detailed spreadsheet used to prepare the Financial Impact Statement for the project and confirmed that the cost estimates were appropriate, that NPV analysis had been carried out, and the approvals process built into the spreadsheet had been completed. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> ▪ We confirmed that lifecycle costs have been included in the project Business Case. These have been developed from a detailed spreadsheet based on Water Corporation's historic information for other similar projects and assets. ▪ We reviewed the Commissioning Plan for the Baandee Pipeline Project and confirmed the required testing regime and the data to be provided to Water Corporation. We also observed the Primavera P6 Gantt Chart for the project schedule. This was developed based on best practice and Water Corporation historic project data. ▪ We reviewed the Commissioning Report for Baandee Pipeline Project the and confirmed that it provided the required test details, including setting out the standards and specific performance testing, the methodologies for carrying out the commissioning and the test results. Defects were also reported. The Commissioning Report is issued to the Asset Manager for their information as asset owner. ▪ We reviewed the Certificate of Practical Completion for the project and confirmed that it had been signed-off by the Project Manager, the Project Director and an Asset Delivery Representative. The Asset Delivery Representative represents other stakeholders within Water Corporation, including the O&M groups and also the overall asset owner who will be responsible for the asset going forwards. <p>Goldfields and Agricultural Region Water Supply Scheme Site Visit</p> <ul style="list-style-type: none"> ▪ Water Corporation has a program of work that has identified through the Asset Investment Program process. ▪ Leak and bursts data has been used to develop the program of work. High levels of bursts and leak incidents have been observed on the pipes in the GAR. These are considered to be due to a number of reasons, including the quality of the original construction, the historical push to get the pipes built, different methods of construction, the life of galvanised pipes compared to modern materials and the overall age of the assets. Bursts and leak information forms part of the corporate KPI set that is reported to Water Corporation's executive. ▪ As a result of the work on the GAR program that Water Corporation has completed to date, the bursts and leaks for the scheme have started to reduce. Water Corporation is currently into year 3 of a 5 year program of investment in the GAR scheme which is focused on managing the failure rate and maintaining current level of service. ▪ Previously the GAR water supply scheme assets were run to fail but Water Corporation has changed to approach to be more proactive with regard to asset inspections, planned maintenance, and targeted replacements/renewals. In addition, the maintenance debt for the scheme was increasing and Water Corporation identified that this needed to be addressed. 	
<ul style="list-style-type: none"> ▪ Evaluations include all life-cycle costs 	<p>Summary</p> <ul style="list-style-type: none"> ▪ We consider that Water Corporation has in place appropriate processes to ensure that project evaluations include all life-cycle costs and the examples we reviewed show that it has implemented these processes. Water Corporation's comprehensive Plan Assets Framework is supported by a Board Position statement, financial standards and guidelines that ensure 	<ul style="list-style-type: none"> ▪ Asset Acquisition Guidelines (PM-#2367933-v12, version dated 29 March 2017)

Effectiveness Criteria	Observations	Evidence reviewed
	<p>that lifecycle costs are developed and evaluated during the development of capital projects. Workshops are used to determine asset operating and maintenance requirements over the life of the asset and historical cost information is used to build up the costs, taking into account expected changes in demand over time.</p> <p>Overview of Water Corporation's Lifecycle Cost Evaluation</p> <ul style="list-style-type: none"> Water Corporation's Board Position Statement on Infrastructure Asset Management states that it will manage its infrastructure assets throughout their entire lifecycle in a manner that is consistent with Water Corporation's corporate objectives and the International Asset Management Standard, ISO 55000. Whole-of-life cost is defined in Asset Acquisition Definitions, with reference to value for money assessment. The definitions document states that the all life-cycle costs must be considered on an NPV basis when considering value for money. Water Corporation's Project Management Guidelines includes links to the Estimating Guidelines The Financial Impact Statement Guidelines outline the purpose and provide guidance for the completion and approval of the Financial Impact Statement. Water Corporation's Manage Finance – Evaluate Investments Standard is used to ensure that the likely financial outcome of proposed investments is clearly understood, all investments and investment options, including staging options, are to be subject to financial analysis using the Discounted Cash Flow/NPV methodology. Investment Evaluation is used by Water Corporation in the financial analysis of all of its Category A, B and C major projects. The Standard also applies to all non-standard financial analyses, such as projects involving new technology. The financial analysis examples supplied by Water Corporation all provide net present value (NPV) estimates of whole-of-life costs. To comply with Corporate Standard Manage Finance – Evaluate Investments, the Net Present Value (NPV) of all investment and investment options is required to be calculated. This analysis commences during the Concept Design development. The Design Manager is responsible for carrying out the NPV analysis and the Financial Analyst (service provided by Financial Evaluation section) is responsible for reviewing the NPV analysis and supporting the design manager. The Concept Design Stage includes a preliminary operating and maintenance cost estimate. This provides a breakdown of the cost estimate for an agreed time frame into categories such as maintenance, operations labour, chemicals and energy usage (e.g. electricity, diesel or gas), taking into account expected changes in demand over time. Operations and maintenance tasks lists are used to guide the assessment, with generic tasks lists from previous lessons learned collated in consultation with Asset Management Services 	<ul style="list-style-type: none"> Cost Estimating for Assets Planning Group ##365453, 12 July 2017 S066 Manage Finance – Evaluate Investments #367574, 26 June 2018 Plan Assets Framework #15643272 13 September 2018 Cost Estimating for Assets Planning Group ##365453, 12 July 2017

Effectiveness Criteria	Observations	Evidence reviewed
	section. Historic costs for operating activities and maintenance tasks are used to build up the lifecycle costs.	
<ul style="list-style-type: none"> Projects reflect sound engineering and business decisions 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of Water Corporation's documentation and sample projects, we consider that Water Corporations has adequate policies and procedures in place to undertake full project evaluations for new assets. There are requirement under the Procurement Policy and the Asset Acquisition Guidelines provide the framework for sound decisions to be made. Further evidence was provided through observations and interviews with key personnel during a site visit to the Goldfields and Agricultural Region Water Supply Scheme and documentation that was provided for the Baandee Pipeline Project that was reviewed in detail (refer to the observations against the previous criteria). <p>Overview of Water Corporation's Project Decision-Making</p> <ul style="list-style-type: none"> Water Corporation's Procurement Policy operationalises the requirement that under the <i>Water Corporation Act 1995</i>, the business's procurement processes and procedures must be consistent with sound commercial practice. The Asset Acquisition Guidelines provide the framework for sound decisions to be made. Water Corporation's Engineering Design Manual describes the primary elements of Water Corporation' design process. It is supported by additional procedures and work instructions which provide the specific detail to support each stage of the design process. A design undertaken within Water Corporation follows the process steps described in this document. The steps are used for all design projects irrespective of size or complexity. This process allows Water Corporation to achieve a consistent approach to its engineering design. The Engineering Design Manual includes a section on Design Alternatives Review, which includes a Review Workshop to determine a single recommended Design Alternative to progress to Engineering Design. This is achieved by discussing the recommended options from the Planning Review in Activation. The outcomes of the Design Alternative Review workshop are captured by Water Corporation in the Design Alternatives Review Outcome Template. All Design Alternatives considered are recorded, along with pros and cons and reasons for recommending further engineering design effort or for not progressing with a design alternative. An important process for enabling sound engineering decisions is the design alternative review (DAR) which is documented in the Engineering Design Manual. As part of the Development Phase of the Asset Acquisition Process, the processes focus on establishing the need for investment and ensuring that options are assessed against financial and non-financial criteria. To comply with Water Corporation's Corporate Standard S066 Manage Finance – Evaluate Investments, the Net Present Value (NPV) of all investment and investment options must be calculated and this analysis commences during the Design Alternative Review. If a single 	<ul style="list-style-type: none"> PCY216 Procurement of Goods and Services Policy #364850, 31 July 2018 Asset Acquisition Guidelines (PM-#2367933-v12, version dated 29 March 2017) Engineering Design Manual #1074204, 07 August 2018 Cost Estimating for Assets Planning Group ##365453, 12 July 2017 S066 Manage Finance – Evaluate Investments #367574, 26 June 2018 Project Scoping Business Case #2366894, 27 January 2017 Asset Acquisition Guidelines (PM-#2367933-v12, version dated 29 March 2017) Financial Impact Statements Manual #13067700, no date

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Design Alternative cannot be determined, then multiple Design Alternatives may be endorsed for further investigation and this triggers the requirement for the Concept Design stage.</p> <p>Goldfields and Agricultural Region Water Supply Scheme Site Visit</p> <ul style="list-style-type: none"> During our review we observed pipe banding being carried out on the main pipeline approximately 25 km from Mundaring. Pipe banding is used to strengthen the pipe at its joints, which are the weak points in with pipe, to increase the asset life and its operational use. Inspections of the pipeline during normal planned maintenance work have been used to identify the areas where remedial work is required. Areas of concern that have been identified have been marked up on plans of the pipe. Water Corporation has used its risk assessment process to prioritise the work and to also prioritise the program against other work that Water Corporation has identified as needing to carry out. The inspections and mark ups are carried out during summer when there is a fire ban that means that welding cannot be undertaken on the pipe. Water Corporation's Northam workshop manufactures all the bands that Water Corporation uses to strengthen the pipe. 	
<ul style="list-style-type: none"> Commissioning tests are documented and completed 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation and interviews with key staff, we confirmed that that commissioning tests are documented and completed. The Asset Commissioning Guideline describes Water Corporation's minimum commissioning requirements. The asset acquisition process includes a handover and closeout phase, with the Asset Handover Guideline describing the asset handover process to ensure the delivery of fit-for-purpose assets. The processes also apply to assets being transferred to Water Corporation by third parties. We confirmed Water Corporation's practices through a review of the project documentation for the upgrade of the Chidlow Water Pump Station that was visited during the site visit to the GAR water supply scheme <p>Overview of Water Corporation's Asset Commissioning Processes</p> <ul style="list-style-type: none"> The Asset Commissioning Guideline describes the roles and responsibilities of the Commissioning Manager, commissioning team members, project team members and key business stakeholders in the commissioning process. The guideline further provides an outline of the required commissioning process and the key elements and deliverables. The Commissioning stages include: <ul style="list-style-type: none"> Commissioning Planning, with a Commissioning Plan developed to identify the methodology by which the entire commissioning process for an asset is planned and performed and it will complement the plan for Handover. 	<ul style="list-style-type: none"> Asset Commissioning Guideline #457191, version 26 July 2019 Asset Data Handover Guideline PM589709, 08 August 2016 Asset Handover Checklist #606059, 16 February 2017 Asset Acquisition Guidelines (PM-#2367933-v12, version dated 29 March 2017)

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – Supply verification, to verify and document that the supply and manufacture of equipment prior to delivery and installation meets specification. – Construction Verification, to inspect all components of the assets to ensure they have been constructed and installed in accordance with the manufacturer's specifications and procedures – Pre – commissioning, to carry out functional testing of individual items of equipment, usually towards the end of the construction phase when installation is substantially complete – Equipment Commissioning, to test the full operation of all equipment and control systems under various conditions and modes of operation. – Integration Commissioning, when applicable, to test the functionality of a new asset within an existing asset system. – Proving Period, consisting of operating the asset for a given length of time to provide assurance that the asset is capable of reliable operation whilst proving performance as specified. – Optimisation Period, to refine and improve the functionality of the asset and to identify and trial improvements in the efficient operation of the asset. Opportunities for optimising may arise post commissioning or after Asset Transfer. – Operations and Support, to ensure that adequate operational support is available where needed and commissioning or interface issues are sufficiently documented and appropriately addressed to minimise impact on existing operational assets. – Operations and Maintenance Training, including the development of a Training Plan and documenting the needs <ul style="list-style-type: none"> ▪ Commissioning Managers manage the majority of the commissioning process. They represent the Asset Manager to verify that the assets are delivering the requirements as set out in the specification. The Commissioning Managers also manage the processes involved with integrating the relevant asset information back into Water Corporation's corporate systems, e.g. SCADA, SAP asset register, etc. ▪ Optimisation is not typically a responsibility of the project team or Commissioning Manager. Responsibility for optimisation is agreed between the Asset Manager, Project Manager and the Operations Manager. ▪ The Project Manager is responsible for developing the Training Plan. <p>Asset Handover</p> <ul style="list-style-type: none"> ▪ Water Corporation's Asset Acquisition process includes a handover and closeout phase. The Asset Handover process commences during the Scope Phase and Asset Transfer occurs after Project Practical Completion (PPC) at the end of the Deliver phase. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> ▪ The Asset Handover Guideline describes the asset handover process to ensure the delivery of fit-for-purpose assets. It is used by to identify the elements of handover and related work processes, procedures and instructions to be used to ensure successful transfer of quality infrastructure assets from the Capital project to the Asset Manager or whoever is their delegate. ▪ The Guideline provides an overview of the elements of the asset transfer process and defines the roles and responsibilities for delivery of these elements. The Guideline is used in conjunction with a number of other Water Corporation documents, including the Asset Acquisition Guidelines, the Project Management Guidelines and the Asset Delivery Representative Guideline. ▪ The Asset Handover Guideline sets out the Handover Elements, which includes: <ul style="list-style-type: none"> – Commissioning – O&M manuals – Maintenance planning – Spare parts – Training – Asset data – Drawings – Defects and warranty – Licences and approvals – Occupational Safety and Health – Software and SCADA – Security and Fire Process – Financial and resource impacts. ▪ Each of the handover elements has its own detailed guideline document. ▪ There is also in place an Asset Data Handover Guideline. ▪ Water Corporation develops Commissioning and Handover Strategies for its projects that are used to develop a Commissioning Plan for the contractors to implement. The Commissioning Plan is reviewed by the Commissioning Manager ▪ An Asset Handover Checklist is used to record that the required deliverables have been provided in the handover. The Checklist includes the documents related to operating and maintain the new asset and confirmation that the Commissioning Plan, Commissioning Results and Commissioning Report have been provided and finalised. ▪ An approvals tracking spreadsheet is created for each project to manage all the approvals and licences required for the new asset. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> ▪ A Project Validation Report is used as a final report to report on the three project phases of design, commissioning and project management validation. ▪ An Asset Transfer Certificate is produced by the Project Manager to confirm that the project has delivered on all its obligations. At this stage of a project there may still be some minor defects but these will not be impacting on operations or service delivery. ▪ A Project Close Out Report is a Project Management deliverable that is used to provide a summary of the project, including issues, costs, change control details, project highlights, innovations and lessons learnt. Close Out Reports are kept on the Project Managers section of Water Corporation's intranet to allow other Project Managers to view them. <p>Transfer of Assets to Water Corporation</p> <ul style="list-style-type: none"> ▪ Developer contributed assets and other third party assets that are transferred to Water Corporation ownership go through the same handover processes as for the assets that Water Corporation creates and acquires. There is an annual audit carried out by KPMG of these assets and Water Corporation also prepares a report on the works that have been handed over. ▪ Water Corporation has a procedure for the Transfer of Third Party Operational Assets which defines the process and requirements of taking over assets established and previously operated by a private entity or a subsidiary of the West Australian State Government. Water Corporation has written the procedure to cover three different scenarios: <ul style="list-style-type: none"> – If the assets are in good condition, – If the assets would be in good condition if Water Corporation completes some minor remediation work – If the assets are in poor condition. ▪ Typically most assets that are transferred to Water Corporation require some work to bring them up to the required Water Corporation specifications and standards. ▪ Water Corporation has taken over four water supply schemes supplying indigenous communities. These communities were already connected to Water Corporation's infrastructure so the assets that have been transferred are low-level reticulation assets. Water Corporation provided us with a list of assets that have been transferred during the review period and we confirmed that there is a separate report for each of the four towns <p>Goldfields and Agricultural Region Water Supply Scheme Site Visit</p> <ul style="list-style-type: none"> ▪ We visited the Chidlow Water Pump Station (WPS), a critical pump station on the GAR main pipeline out to Kalgoorlie. The WPS is operated remotely from the OC and runs at full capacity. Water Corporation has completed an upgrade project at the WPS during the review period. The outturn cost of the project was \$4.3M. The project was carried out to improve the reliability of the asset by providing an emergency diesel generator set, as well as a fire suppression system, additional security and upgrades to the existing power to the site. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> We reviewed the project documentation and confirmed that it included all of the required information elements. This included an approved checklist that has been used to review whether the upgrade has provided the benefits that were identified as being needed from the assets when the project was first proposed. 	
<ul style="list-style-type: none"> Ongoing legal / environmental / safety obligations of the asset owner are assigned and understood 	<p>Summary</p> <ul style="list-style-type: none"> We consider that Water Corporation has in place a robust processes to ensure that the ongoing legal / environmental / safety obligations of the asset owner are assigned and understood. These are set out in a number of key documents, including the External Approvals Manual, Asset Handover Maintenance Guideline and Operational Contingency Planning Handover Guideline. We observed generic and specific safety obligations had been documented and were being adhered to during our site visit to the GAR water supply scheme. <p>Overview of Water Corporation's Asset Obligation Processes</p> <ul style="list-style-type: none"> Water Corporation's External Approvals Manual for engineering infrastructure capital projects and developer funded works provides a checklist to assist Water Corporation staff, design consultants and contractors comply with the relevant legislation and other statutory requirements. Water Corporation has a legislative register and receives notifications for any changes to the legislation that the Corporation operates under. Third parties engaged by Water Corporation for design or project delivery activities work to the same External Approvals Manual. Water Corporation has an External Approvals team that works with the nominated Project Manager to identify approvals and licences required for the new asset. This assessment is carried out in the scoping phase of the project as any issue may impact on the overall project delivery timeframe. Water Corporation has prepared handover guidelines to assist in ensuring that ongoing obligations relating to newly acquired assets are understood and incorporated into business as usual practices. Handover guidelines are in place for: <ul style="list-style-type: none"> Occupational Health and Safety Operations and Maintenance Manuals SCADA Security and Fire Drawings Spare parts Training Requirements Other documentation related to handover also provided for 2018 AMS review: <ul style="list-style-type: none"> Asset Handover Maintenance Guideline 	<ul style="list-style-type: none"> Defects and Warranty Management Guideline #589718, 12 April 2016 Licences and Approvals Guideline #589719, 12 April 2016 Asset Handover Maintenance Guideline #589721, 12 April 2016 Operating Resources Guideline #589722, 12 December 2016 Operations and Maintenance Manual Handover Guideline #589723, 15 March 2017 OSH Handover Guideline #589724, 13 January 2017 Spare Parts Handover Guideline #589725, 15 March 2017 Training Requirements Guideline #589727, 12 September 2018 Operational Contingency Planning Handover Guideline #15741826, 06 February 2017 Asset Handover Guideline #589729, 12 April 2016 Security and Fire Process Guideline #589731, 27 March 2017 SCADA [Commissioning] Handover Guideline #589733, 07 February 2017 Drawings Handover Guideline #589734, 12 April 2016

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Operational Contingency Planning Handover Guideline <p>Goldfields and Agricultural Region Water Supply Scheme Site Visit</p> <ul style="list-style-type: none"> We observed that Water Corporation uses a generic Job Safety & Environment Analysis (JSEA) template that the work crews add specific site information and risks to. We also observed that the field crew had a Hot Work Permit. Fire risks are assessed separate to the normal work safety risks. 	

5.3 Asset disposal

Table 5-3 Asset Management System Review Observations for Asset Disposal

Effectiveness Criteria	Observations	Evidence reviewed
Asset Disposal		
<ul style="list-style-type: none"> Under-utilised and under-performing assets are identified as part of a regular systematic review process 	<p>Summary</p> <ul style="list-style-type: none"> Based on the process documentation reviewed and the evidence of disposal in the disposal listing and Disposal of Surplus Assets Program business case, we conclude that Water Corporation is identifying under-utilised and under-performing assets as part of systematic review processes. The following sub-headings provide an outline of the key elements of Water Corporation's: <ul style="list-style-type: none"> Asset disposal strategies, Asset Disposal Guidelines, Monitoring, Recording and Reporting Asset Performance Processes, Asset Deficiency Reporting Process Examples of assets disposed or identified as being under-utilised and under-performing during the review period were provided and confirmed as evidence that Water Corporation follows its documented processes. <p>Asset Disposal Strategies</p> <ul style="list-style-type: none"> Water Corporation assigns a strategy to how an asset will be managed through its lifecycle, including the operation and maintenance, renewal and disposal strategies for the asset in the Asset Class Strategies. Processes to identify under-utilised and under-performing assets include: <ul style="list-style-type: none"> Normal operational activities Individual asset planning, monitoring and assessment Capability management and Asset Risk Assessments 	<ul style="list-style-type: none"> Decommission & Dispose Assets Guideline (version date 24 April 2018) Manage Asset Deficiency Work Instruction (version date 14 September 2018) Monitor Asset Performance Work Instruction (version date 14 September 2018) Plan Asset Investigation Work Instruction (version date September 2018) Asset Retirements 15-16 to 17-18 (spreadsheet) Doc no. 20246885 #16803423 - Business case for Disposal Of Surplus Assets #20365358 - Explanation of list of retired assets from Terry Hobson

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – State Wide Planning Program to meet growth requirements – Maintaining assets. <p>Asset Disposal Guidelines</p> <ul style="list-style-type: none"> ▪ Water Corporation's asset disposal and decommissioning processes are aligned with its Plan Assets Framework through the monitoring section, which covers Monitor Asset Performance, Manage Asset Condition, Manage Asset Deficiency, Plan Asset Investigation processes and also linked to other key asset management documents through the framework. ▪ Water Corporation has two key documents that is uses to manage its asset disposal processes: <ul style="list-style-type: none"> – The Decommission and Dispose Assets Guideline – The Plan & Investigate Asset Renewals Guideline ▪ The Decommission and Dispose Assets Guideline describes the process and activities necessary to ensure that Water Corporation's assets are properly decommissioned and disposed of and the relevant corporate systems are updated in a timely manner. The guideline provides guidance on the steps relating to the decision-making and processes for the disposing of the assets, including timings, responsibilities, and post-project activities. ▪ The Plan & Investigate Asset Renewals Guideline outlines the activities that Water Corporation's Asset Managers and Service Delivery partners are accountable to develop, implement and monitor. This includes renewal strategies and plans that specify the detailed activities, resources, responsibilities, timescales and risks for the achievement of the asset management objectives. This is aligned to the disposal and decommissioning processes. If Water Corporation identifies that an asset is not performing as required, its responses revolve around decisions to renew, maintain or decommission/dispose. <p>Monitoring, Recording and Reporting Asset Performance</p> <ul style="list-style-type: none"> ▪ Water Corporation has a Monitor Asset Performance process set out in a work instruction that describes how it monitors its critical assets to ensure that the Levels of Service can be maintained through proactive identification of asset deficiencies which could, unless assessed, lead to unacceptable risks and impacts to Levels of Service. Deficiencies identified by this process are recorded, managed and prioritised by the Asset Deficiency process and investigated through the Asset Investigation process. ▪ Levels of Service are used to decide the strategy for asset monitoring and these are captured in the Asset Class Plans. These set out the profiles of what monitoring needs to be carried out and the frequency that it needs to be carried out at. <p>Asset Deficiency Reporting Process</p>	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Water Corporation uses its Asset Deficiency Report process to identify risks, issues and opportunities likely to impact on the asset management objectives and to provide options for its non-linear (e.g. non-pipe) assets. Water Corporation's "Manage Asset Deficiency" process describes how a deficiency identified either reactively by operational or other staff, or proactively via the Asset Performance Monitoring process, is recorded and managed and how it is documented for further assessment in the Asset Investigation Process. Water Corporation has a Manage Asset Deficiency Work Instruction that outlines the steps in the process. The Asset Deficiency Register forms the key input into the Plan Asset Investigation Process. Water Corporation's Plan Asset Investigation Work Instruction describes how asset failures or emerging asset risks are investigated and resolved in order to ensure that the asset management objectives are achieved. This also includes the engagement of Water Corporation's operational and investment planning teams and escalation of investigations through Water Corporation's Triage process. Investigations can result in operational changes, operational and/or capital investments or an option to take no action and accept increased failure risks where it is deemed appropriate. Water Corporation's Triage process initiates the end-to-end process of identifying, reporting and investigating a risk/issue or opportunity, either reactively or proactively, through asset performance monitoring to activating an investment decision. This includes the processes of Monitor Asset Performance, Manage Asset Condition, Manage Asset Deficiency and Plan Asset Investigations within Water Corporation's overall asset management framework. The Plan Asset Investigation process allows Water Corporation to make decisions based on risk and to instigate investment based on authority and competence. If the investigation is more complex, it can be escalated to the appropriate level within the Corporation. Water Corporation records all water main bursts and leaks in its GIS to visibly show where failures on the pipes have occurred. This information is recorded in a separate layer and the data can also be used to show where customers have been affected and where there has been no impact on customers. Water Corporation also maintains a Mains Data Leaks and Breaks spreadsheet that is used to prioritised areas for pipe renewals based on the number of bursts and leaks experience in that area. Water Corporation has a similar system for reporting wastewater incidents on the sewer pipe assets. Both the water and wastewater systems were observed during the review. 	
<ul style="list-style-type: none"> The reasons for under-utilisation or poor performance are critically examined and corrective action or disposal undertaken 	<p>Summary</p> <ul style="list-style-type: none"> Based on the business Guideline, associated processes and the evidence of the business case reviewed, we consider that Water Corporation critically examines the reasons for poor performance and under-utilisation. We also found evidence to support this criterion under the Asset Planning element. <p>Asset Disposal Decision-Making Processes</p> <ul style="list-style-type: none"> Condition and performance assessment information collected through the asset monitoring processes is included in the Business Cases process used to add projects into Water 	<ul style="list-style-type: none"> Decommission & Dispose Assets Guideline (version date 24 April 2018) #555413 - Notification of Asset Retirements (Write-Offs) Form #10991212 - Program Business Case - CBD Cast Iron Renewal Program #11933369 - Condition assessment report Subiaco CBD Cast Iron

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Corporation's programs. Business Cases are assessed against other potential investments for risk and priority through the strategic investment processes. A business case for the pipe renewal program in the Perth CBD was reviewed.</p> <ul style="list-style-type: none"> ▪ The asset renewal prioritisation process is used to decide if an asset replacement should be carried out on a like-for-like basis or if a change to the asset is required. This includes reviewing the capacity driver to assess whether the asset has the required capacity to perform into the future. ▪ Water Corporation categorises its assets renewals as active renewals and proactive renewals. Active renewals are based on monitoring for failing assets and replacement. Proactive renewals are used for critical assets that Water Corporation does not want to fail and so they are proactively managed to be replaced before they fail. ▪ Disposal and decommissioning of assets at Water Corporation's alliance-managed sites (refer to the Asset Operations information provided in Section 5.5 for details of the alliances) goes through the same Water Corporation corporate processes and follow Water Corporation instructions and replacement/renewal programs. These are funded through Water Corporation's programs and delivered by the alliance partners. ▪ Disposal options depend on Water Corporation's strategies for the asset type and the configuration of the scheme/facility. Tanks may be retained and isolated but kept online for use in emergencies. Assets that are retained are included on the maintenance program so that they can be kept in operational condition for when they need to be used in the future. Options for re-purposing are assessed when assets are renewed or replaced, e.g. replacing a water supply bore but maintaining the existing bore to be used as a monitoring point. For pipes, Water Corporation either reuses or buries them in the verge for small diameter pipes. For larger diameter pipes, typically grout and cap the pipe and leave it in the ground. ▪ Water Corporation treats its linear (e.g. pipe) assets differently due to the asset lives and the failure modes for these assets. Water Corporation has a level of service for its customers that they should not experience more than three unplanned interruptions in a three year period. If a section of pipe hits this trigger it is added to the renewals plan. Water Corporation maintains a spreadsheet register by street when failures are recorded and accumulates this information to develop the pipe renewals plan. Water Corporation spends approximately \$8M/year on its Pipes for Perth pipe renewal program. ▪ Mechanical and electrical (M&E) assets are treated differently to Water Corporation's linear assets as it is able to carry out more maintenance to extend the asset life than for its pipes. For the M&E assets, once the costs become prohibitive to continue to repair, replacement is looked at as an option. Other factors such as growth and pump run times are considered in assessing options for replacement. The time to acquire a replacement assets are also taken into consideration when deciding the timeframe to dispose or decommission an asset. ▪ For tanks and water pump station assets, include assessments of efficiencies, sizing and financial analyses to decide on the asset solution. Pumps may be disposed and replaced with small pumps if identified as an option. ▪ Water Corporation previously had a proactive program to dispose of legacy assets that had been identified as being surplus to its service delivery requirements. This program had been 	

Effectiveness Criteria	Observations	Evidence reviewed
	<p>suspended at the time of the 2015 review as it was considered that it was not cost effective. However, Water Corporation has reinvigorated this program in the last couple of years. A Business Case for the Disposal of Surplus Assets was developed in 2016/17 to re-establish the proactive program.</p> <ul style="list-style-type: none"> Water Corporation's disposal of surplus assets program uses the Priority 1 (Statutory) to 7 (Low Risk) risk format that Water Corporation has embedded across all of the Corporation's asset management activities to allow a risk assessment to be carried out in the development of the disposal program. As a result of using this risk-based approach to disposing surplus assets, some assets identified for disposal are still in place as there isn't funding to remove them. At the review meeting, we requested and reviewed the Business Case for the CBD cast iron water main renewal program. This business case identifies performance issues with cast iron mains of a certain age due to the cement lining. The business case proposes corrective action in the form of replacement of the mains. 	
<ul style="list-style-type: none"> Disposal alternatives are evaluated 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of Water Corporation's documentation and recorded examples, we consider that Water Corporations evaluates disposal alternatives for its assets. <p>Overview of Water Corporation's Asset Disposal Process</p> <ul style="list-style-type: none"> The Decommission & Dispose Assets Guideline states that a decommissioning and disposal project will require a Decommission and Disposal Plan. The Decommission and Dispose Plan details the nature of the decommissioning activities to be applied which reflect the future use determined by the Asset Managers evaluation of business need. Future use could be: Disposal within a capital project; Disposal deferred to a future date where an asset is decommissioned and retained as a contingent or future use asset or may be disposed at a later date; Asset partially decommissioned and remainder still operational. <p>Recording of Asset Disposal</p> <ul style="list-style-type: none"> Assets that are disposed of or decommissioned are logged in the SAP asset register. The asset record in the GIS is also updated to denote that the asset is "not in use". Water Corporation maintains a register of asset disposals. This includes the asset number and description, when it was capitalised and when it was deactivated in SAP, the written down value and accumulated depreciation of the asset when it was retired, the revenue from any sale and whether a profit or loss was made, and text to provide details of how the asset was disposed of (e.g. scrapped, sold, abandoned, replaced, etc.) We were provided with a listing of the assets disposed of in 2015/16, 2016/17 and 2017/18. This listing details the asset, an identification number, book value at retirement, posting date and a description of the reason for disposal. The reasons listed for disposal include sale at auction, transfer to another owner and disposed as part of a capital project. 	<ul style="list-style-type: none"> Decommission & Dispose Assets Guideline (version date 24 April 2018) #19578084 - Manage Asset Deficiency Work Instruction #19666779 - Plan & Investigate Asset Renewals Guideline

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> The register for 2017-18 includes assets from the Burrup Desalination Plant that are currently surplus to Water Corporation's requirements. These assets have a total value of more than \$35M. The plant was originally constructed for a single fertiliser business on the Burrup Peninsula in north WA that no longer operates. Water Corporation has had another industrial customer potentially interested in the assets but this has not yet been progressed. Water Corporation may be able to transfer the assets and is currently waiting to see what happens next in order to be able to make the decision for what it does with the assets. While assets for disposal are identified as part of systematic business processes, Water Corporation restarted its Disposal of Surplus Assets Program in September 2018. The proposed program is documented in an Operational Implementation Business Case which details assets which are considered surplus to business requirements and high risk or high maintenance costs. 	
<ul style="list-style-type: none"> There is a replacement strategy for assets 	<p>Summary</p> <ul style="list-style-type: none"> We consider that based on the information presented here and under the Asset Planning element, Water Corporation has a replacement strategy in place for its assets. We discuss Water Corporation's asset planning strategies more fully under the Asset Acquisition and Capital Expenditure Planning elements. <p>Overview of Water Corporation's Asset Replacement Strategies</p> <ul style="list-style-type: none"> Asset replacement falls under the wider consideration of sustaining service delivery. Water Corporation identifies appropriate asset and non-asset solutions when assets reach the end of their lives. Asset solutions may include replacement but also renewal and refurbishment. The Plan and Investigate Asset Renewals Framework outlines the activities that Asset Managers and Service Delivery partners are accountable to develop, implement and monitor for the renewal of assets The Business Case for the cast iron main renewal program provides an example of a replacement strategy for a cohort of assets. 	<ul style="list-style-type: none"> Plan & Investigate Asset Renewals Guideline (version date 22 October 2018) #577854 - Schedule of Standard Economic Lives #9360426 - Notification of Accelerated Depreciation of Assets #10991212 - Program Business Case - CBD Cast Iron Renewal Program

5.4 Environmental analysis

Table 5-4 Asset Management System Review Observations for Environmental Analysis

Effectiveness Criteria	Observations	Evidence reviewed
Environmental Analysis		
<ul style="list-style-type: none"> Opportunities and threats in the system environment are assessed 	<p>Summary</p> <ul style="list-style-type: none"> Based on the evidence provided to us and the interviews with key staff, we consider that Water Corporation assesses opportunities and threat in its system environment. The environmental scanning process, the Asset Management Strategy and the stakeholder engagement process are all robust business processes that enable Water Corporation to identify and assess opportunities and threats in its system environment. In addition to these 	<ul style="list-style-type: none"> #19386972 - External Scan Guideline #19302455 - Example of Environment Scan #2 - June 2018 External Scan for Board Engagement.pptx

Effectiveness Criteria	Observations	Evidence reviewed
	<p>processes, Water Corporation provided to us considerable evidence that it implements these processes, e.g. the environmental scans for Board papers and the stakeholder engagement plans.</p> <p>Overview of Water Corporation's Environmental Analysis</p> <ul style="list-style-type: none"> Water Corporation undertakes environmental scanning as part of its annual corporate planning processes. Environmental scanning informs the development of its business plans and the Statement of Corporate Intent. An Environmental Scan Guideline has been prepared with a stated purpose to facilitate a consistent approach to external environmental scanning. The Guideline is part of Water Corporation's Corporate Strategy Framework executed by the Strategy, Policy and Analytics (SPA) business unit to develop the Corporation's corporate strategy. We were provided two example outputs of the environmental scanning processes – June 2018 and May 2016 – both of which formed papers for Board strategy sessions. The June 2018 environmental scan identifies the following material external trends over the 10 year forward horizon: <ul style="list-style-type: none"> Demographics and social change Natural water scarcity and access Digital disruption in operating models Debt and long term capital access Government ownership and regulation Energy and industrial process change Customer expectations & preferences At the asset management system level, Water Corporation's asset management system defines asset management objectives that support the corporate objectives. The operating context influences these objectives and it is a requirement of ISO55001:2014 that this operating context is known and documented. Water Corporation's Asset Management Strategy performs this function. The current Asset Management Strategy is dated April 2018 and has a 20 year planning horizon to 2038. The Asset Management Strategy is updated every three years. Water Corporation also has the two following systems to assist in identifying opportunities/threats: <ul style="list-style-type: none"> System Risk Assessment Asset Risk Assessment These two systems are described in detail in the Risk Assessment section of this report. Water Corporation has strengthened its approach to engaging with stakeholders important to its business. It has identified around 140 stakeholders important at the corporate level. Each of these stakeholders has been assigned a relationship manager. There is a Stakeholder 	<ul style="list-style-type: none"> #20230593 - Example of Environment Scan #1 - May 2016 Board Strategy Session Pre-Reading.pptx #18795449 - Wyndham Water Monitoring Summary #19525746 - Statement of Corporate Intent 17-18 #20186938 - Asset Management Strategy #5288521 - Strategy to Action Roadmap #14915317 - DOH Stakeholder Engagement Plan – 2017-18" #15045269 - Corporate Business Plan 2016-17 #15508084 - PCY262 Stakeholder Engagement Policy #178933 - PCY066 Water Efficiency #364874 - PCY272 Drinking Water Source Protection Policy #365213 - Wyndham Water Resource Management Operating Strategy" #392001 - Arrowsmith Water Resource Management Operating Strategy #6245506 - Senior Managers Chart #15570005 - Customer Strategy 2016 - 2021" #15930055 - Busselton WW Disposal Performance Compliance Report (15-16) #17671533 - Laverton WWTP Annual Audit Compliance Report 16-17 #17930187 - Strategic Asset Plan

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Engagement Policy which was provided to us for our review. This policy sets out the principles for prioritising engagement with stakeholders to ensure Water Corporation is identifying issues and influences that are important to its own objectives.</p> <ul style="list-style-type: none"> For major stakeholders, a stakeholder engagement plan is developed and updated annually. This document identifies how the stakeholder is important to Water Corporation and the priorities for engagement based on the known understanding of the operating environment. Water Corporation provided an example the engagement plan for the Department of Health for 2017/18. 	
<ul style="list-style-type: none"> Performance standards (availability of service, capacity, continuity, emergency response, etc.) are measured and achieved 	<p>Summary</p> <ul style="list-style-type: none"> We consider that Water Corporation has in place effective systems to measure and monitor relevant performance standards be they external obligations or internal performance metrics. We observed that the Business reviews monitoring data through its monthly reporting process and this helps it to achieve its performance standards through timely implementation of corrective actions or mitigation measures. <p>Overview of Water Corporation's Performance Standard Reporting and Review</p> <ul style="list-style-type: none"> Water Corporation's operating licence at Schedule 4 details "Service & Performance Standards". Obligations The service and performance standards cover the following: <ul style="list-style-type: none"> Potable water system – pressure and flow standards Potable water system – pressure and flow exemptions Water restrictions Drainage service standards Irrigation service standards Farmland Areas Water System Standards These Service and Performance Standards are subject to audit as part the periodic audits of the Operating Licence. The audit for the period to 30 June 2018 is currently being finalised. This audit identified a non-compliance for the period 1 July 2016 to 30 June 2017 as not all customers received the required continuity of pressure and flow for water services. The operating licence audit assigned a compliance rating of 2 and an adequacy of controls rating of A. Performance against these standards is measured and subsequently reported through the provision of the following information to the Authority on an annual basis: <ul style="list-style-type: none"> Performance reporting datasheets Information on drought response, services provided by agreement and drainage Data for Minor Towns benchmarking Water Corporation has in place a "Business Performance Reporting" system for internal reporting purposes. This is a business intelligence tool that draws relevant data from various corporate systems and data sets and is the single point of truth for performance monitoring 	<ul style="list-style-type: none"> Live demonstration of Business Performance Reporting system Performance reporting data submissions from Water Corporation to ERA for 2015/16, 2016/17 and 2017/18 including covering letters and data spreadsheets #18100347 - Arrowsmith Annual Water Monitoring Summary #18140726 - Kemerton WW Disposal Performance Compliance Report 16-17 Water Services Code of Conduct (Customer Service Standards) 2018

Effectiveness Criteria	Observations	Evidence reviewed
	<p>and reporting. Most indicators are reported monthly with responsible managers required to identify the reasons for observed variances</p> <ul style="list-style-type: none"> The Business Performance Reporting system covers multiple business areas and each user is provided with access to the performance data related to their role and level of authority. The performance reporting rolls up through organisational level to provide Board level reports which provide relevant summaries of the same data that staff at lower levels also monitor and report on. In this way, Water Corporation is able to achieve a consistent approach to performance monitoring. The Business Performance Reporting system was demonstrated during the review. We saw the performance report for the General Manager – Assets Planning. We observed that the Business Performance Reporting system includes definitions for indicators as well as current performance and trend information. We also reviewed the whole of Corporation Scorecard and the Business Unit Scorecard for the Contact Centre. The whole of Corporation Scorecard includes a Corporate Performance Index. This is a quarterly survey of customers against 28 measures. Water Corporation's current performance is 7.25 (out of 10) against a target of 7.07. 	
<ul style="list-style-type: none"> Compliance with statutory and regulatory requirements 	<p>Summary</p> <ul style="list-style-type: none"> We consider that Water Corporation has in place robust processes for identifying its statutory and regulatory compliance obligations, making staff aware of these obligations and acting in accordance with these obligations. These processes including complementary levels of assurance, e.g. through policy principles, the letters of representation which promote understanding of the responsibility of individuals and the breach reporting framework. With these processes in place, which we consider to be robust, Water Corporation has recorded 59 actual or potential breaches over the review period. We consider that these breaches are a result of the breadth and complexity of Water Corporation's operations over a wide geographic area. We note that no serious breaches have been confirmed in the review period. Because of the number of breaches recorded, we have assigned a performance rating of 2 (opportunity for improvement) for this effectiveness criterion. <p>Overview of Water Corporation's Statutory and Regulatory Compliance Requirements</p> <ul style="list-style-type: none"> Water Corporation has in place various policies which include principles that the business should be compliant with statutory and regulatory requirements. For example: <ul style="list-style-type: none"> PCY220 Wastewater Recycling states that "Treated wastewater must be returned to the water cycle in a sustainable manner that meets relevant health and environmental protection regulations" PCY261 Drinking Water Quality Policy includes the principle that Water Corporation "meets the health-related requirements of the Australian Drinking Water Guidelines and work to progressively improve the aesthetic quality of water supplied to our customers". 	<ul style="list-style-type: none"> Live demonstration of the online legislation register PCY230 Environment Policy (#6547166) PCY220 Wastewater Recycling (#764114) #18439818 - PCY327 Wastewater Quality Policy" #18632148 - Drinking Water Quality #764114 - PCY220 Wastewater Recycling #6547166 - PCY230 Environment Policy Annual Report 2016-17 Annual Audit Compliance Reports for Kojonup WWTP (17/18) (#19833048 and Laverton WWTP (16/17) (#17671533). Wyndham Water Resource Management Operating Strategy (#365213) Wyndham Water Monitoring Summary (#18795449) Arrowsmith Water Resource Management Operating Strategy (#392001) Arrowsmith Annual Water Monitoring Summary (#18100347) Jurien WWTP Annual Environmental Report 17/18 (#19971527)

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> The policy and principle approach provides the starting point for how Water Corporation seeks to comply with its statutory and regulatory obligations. Various reports are made under these management systems and with relation to specific statutory and regulatory requirements. Examples of compliance reporting documents that we reviewed before and at the review meetings include: <ul style="list-style-type: none"> Drinking Water Quality Annual Report 2016-17 Annual Audit Compliance Reports for Kojonup WWTP (2017/18) and Laverton WWTP (2016/17) Wyndham Water Monitoring Summary Arrowsmith Annual Water Monitoring Summary Jurien Waterwater Treatment Plant (WWTP) Annual Environmental Report 2017/18 Northam WWTP Annual Environmental Report 2017/18 Kojonup WWTP Annual Audit Compliance Report 2017/18 Laverton WWTP Annual Audit Compliance Report 2016/17 Kemerton Wastewater (WW) Disposal Performance Compliance Report 2016/17 Busselton WW Disposal Performance Compliance Report (2015/16) Drinking Water Quality Annual Report 2016/17 To operationalise the management system policy principles of compliance, Water Corporation has an online register of relevant legislation. During the review, we viewed the online register and saw that the content had been updated in July 2018. There are around 160 items of legislation within the register. The register identifies process owners, controls that are in place and monitoring undertaken. The effectiveness of controls is assessed by the process owner who also needs to identify gaps in the controls and what is being undertaken to address these gaps. Reporting requirements and penalties for non-compliance are also noted within the system. Compliance is also considered as part of the corporate risk management process. Water Corporation uses a letter of representation process which requires managers to provide representation that they have understood and complied with obligations relevant to them. These are collated as part of the financial auditing process. We were provided with the template for the letter of representation and also witnessed a number of draft letters relating to the 2017/18 financial year at our review meeting. Water Corporation has in place breach reporting framework. Breaches are recorded and reported to the Board audit and risk committee. Water Corporation provided to us its breach register for the review period for breaches relating to service delivery. The breach register details 59 breaches. Of these breaches, 48 are recorded as closed and 11 as open. We understand that some of the items that are currently open may eventually not be found to be breaches. The breakdown of the year the breaches were recorded is as follows: <ul style="list-style-type: none"> 2015/16 – 40 breaches 	<ul style="list-style-type: none"> Northam WWTP Annual Environmental Report 17/18 (#19961091) Kojonup WWTP Annual Audit Compliance Report 17/18 (#19833048) Laverton WWTP Annual Audit Compliance Report 16/17 (#17671533) Kemerton WW Disposal Performance Compliance Report 16/17 (#18140726) Busselton WW Disposal Performance Compliance Report (15/16) (#15930055) Drinking Water Quality Annual Report 2016-17 (#18632148) #20412272 - Customer Meter Disputes.DOCX #16749285 - Customer and Community Group Business Plan 2017-18.XLSX #17098471 - Letter of Representation #17705492 - Example of report to Board re policy changes #18079262 - Corporate Stakeholder Strategy.PPTX #20355636 - Breach Register (redacted) for review period.xlsx

Effectiveness Criteria	Observations	Evidence reviewed
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Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – Irrigation service standards – Farmland Areas Water System Standards ▪ As noted above, these Service and Performance Standards are subject to audit as part of Water Corporation's periodic Operating Licence Audit. The audit for the period to 30 June 2018 is currently being finalised. ▪ Water Corporation also has customer service measures against which it measures its own performance that are in addition to those identified in the licence. Water Corporation's Customer Strategy outlines commitment to customers, customer expectations, strategic statements and how these will be achieved. At the review meetings, we reviewed Water Corporation's online performance reporting system which documents target and current performance across a suite of measures including customer service measures. This system is also used for reporting the Operating Licence Service and Performance Standards. The system allows reporting for different measures at different levels of the organisation. ▪ Water Corporation has undertaken a significant customer engagement project titled "Tap In". The specific objectives of Tap In were to: gain a comprehensive understanding of what is important to our customers, identify areas for change that are a priority for our customers, test, quantify preferences for, and refine proposed solutions from Water Corporation. Water Corporation advised that the findings from the Tap In engagement will shape future customer service measures. 	

5.5 Asset operations

Table 5-5 Asset Management System Review Observations for Asset Operations

Effectiveness Criteria	Evidence reviewed
<ul style="list-style-type: none"> • Operational policies and procedures are documented and linked to service levels required 	<p>Summary</p> <ul style="list-style-type: none"> ▪ During our review we confirmed that Water Corporation has documented operational policies and procedures that are linked to service levels required. We have arrived at our conclusion based on review of key operational documentation, including operating policies, operating plans and strategies and work programs, interviews with key personnel, site visits to a number of schemes and the operational centre. ▪ We have recorded our observations below under the following sub-headings: <ul style="list-style-type: none"> – Overview of Water Corporation's Operations – Aroona Alliance Operations – Perth Desalination Plant Operations – Mundaring Water Treatment Plant Operations – Operating Policies – Operating Plans & Strategies
	<ul style="list-style-type: none"> ▪ S-CL-CV-2018 Gravity Sewer Asset Class Plan (ACP) #19375983 ▪ S110 Incident Management #2353912, 04 August 2018 ▪ Plan Scheme Operations Policy (PCY340) #3955868, 21 May 2018 ▪ Work Program Formulation Guideline #6352223, 24 October 2018 ▪ SCADA Infrastructure Plan #7796020, March 2018 ▪ PCY194 Incident Management #9365458, 04 August 2017

Effectiveness Criteria	Evidence reviewed
<ul style="list-style-type: none"> – Work Programs – Linkage to Levels of Service – Water Corporation operational centre site visit <p>Overview of Water Corporation's Operations</p> <ul style="list-style-type: none"> Water Corporation differentiates between scheme operations and asset operations. Scheme operations relates to the operations of the overall scheme, whereas asset operations relates to the individual assets and has regard to O&M standards. Water Corporation considers that whereas most of the Regions have a scheme-based view to operations, the Perth Metropolitan area has more of an asset-based focus with regard to operations management. Water Corporation has created individual operational documents for each scheme. Some of the larger schemes, such as the Great Southern Town Water Supply Scheme (GSTWS), have an overall document with separate individual documents for the sub-schemes. There is a guideline which directs Scheme Operations - Execute Scheme Operations. In the Execute Scheme operations document, a criteria table defines where centralised operations may be possible. A list of Operations Centre managed Schemes (12) is listed in List of Scheme Operating Plans The Regions are responsible for the operations in their designated areas. However, the operation of some critical schemes, where there may be specific licence constraints related to how the system is operated, has been transferred to the centralised Service Centre based in Perth. <p>Aroona Alliance Operations</p> <ul style="list-style-type: none"> The Aroona Alliance, an integrated alliance of Water Corporation, SUEZ and its partner Transfield Services, are responsible for the operations and maintenance of the water production and treatment assets in the Perth Metropolitan area, excluding the desalination plants and the Mundaring Water Treatment Plant (WTP). However, Water Corporation is the owner and ultimately responsible for the operations of these assets. The contract began on July 1, 2012, and has an initial term of 10 years (with a possible extension of a further 5 years). Prior to the formation of the Aroona Alliance, the operations of the Perth Metro schemes was carried out in-house, with the maintenance carried out by the Corporation in partnership with a maintenance contractor. Aroona employs a mix of Water Corporation and contractor staff, with shared performance incentives. Water Corporation contributes the highest proportion of staff, with approximately 60% of the alliance's staff being Water Corporation employees. Aroona manages and operates six groundwater treatment plants, 14 wastewater treatment plants and two advanced water recycling plants, as well as 13 dams, 190 boreholes and 520 km trunk mains to deliver services to Water Corporations customers. 	<ul style="list-style-type: none"> WebEOC – Quick Reference Sheet #14464012, 19 December 2017 Execute Scheme Operations - System Change Instruction #16811652, 18 May 2017 Scheme and Asset Operations Plan Guideline #17361040, 29 September 2017 AAP Single Page Risk Prioritisation #17943506 Execute Scheme Operations – guideline #18991455, 13 April 2018 Develop Standard OC Scheme Report #19114692, 13 April 2018 Asset Registration SAP PM FLER Guideline #19183829, 15 August 2018 Record of incidents - Sentinel Asset Related Incident listing #20255025, 18 October 2018 Planned Operations and Maintenance Prioritisation Process Guideline (#19738138) (version date 4 July 2018) FICO Quick Reference Sheet #458013, 11 September 2018 SAP Plant Maintenance Ready Reckoner #506554, 08 September 2017 Settlement of Assets Work Instruction #577852, 31 October 2017 Asset Data Handover Guideline PM589709, 08 August 2016 FICO Quick Reference Sheet - Financial Master Data Maintenance - Accounts_Cost Elements_CE Groups #824139, 11 September 2018 Quick Reference Sheet - Work instruction for how to create a Functional Location (FL) using SAP #824434, 19 March 2012

Effectiveness Criteria	Evidence reviewed
<ul style="list-style-type: none"> The Aroona alliance operations do not extend to the reticulation mains or sewers or any of the drainage assets. These are managed by Water Corporation through its Perth Regional group. <p>Perth Desalination Plant Operations</p> <ul style="list-style-type: none"> Water Corporation's two metropolitan desalination plants are operated by two other alliance partnerships. The Perth Seawater Desalination Plant is managed by an alliance consisting of Water Corporation, SUEZ and Multiplex. The Southern Seawater Desalination has an alliance that comprises Tecnicas Reunidas, Valoriza Agua, AJ Lucas, WorleyParsons and the Water Corporation. <p>Mundaring Water Treatment Plant Operations</p> <ul style="list-style-type: none"> The Mundaring Water Treatment Plant is a PPP that supplies treated water to the Goldfields and Agricultural Water Supply (G&AWS). The PPP contract comprises the design, construction, financing, operation, and maintenance of a new 160 to 240 ML/d expandable raw water pump station and water treatment plant. Commissioning of the plant started in September 2013 and was completed, including Performance Testing in December 2013. The Mundaring Water Treatment Plant has been designed, constructed, financed and is operated and maintained by Helena Water, a consortium of the Royal Bank of Scotland, Acciona Agua, United Utilities and Brookfield Multiplex. The contract for the WTP runs for 35 years, at which point the plant will be handed back to the Water Corporation. In June 2011, the Governor provided for an exemption – (The Water Services Licensing (Mundaring Water Treatment Plant) Exemption Order 2011) exempting, under specified conditions, Helena Water from the requirement to hold a water licence under the Water Services Licensing Act 1995. As a result, the water assets managed by Helena Water (including the Mundaring Water Treatment Plant) are not included in the scope of Water Corporation's 2018 Review. <p>Operating Policies</p> <ul style="list-style-type: none"> Water Corporation's Plan Scheme Operations Policy sets out the Corporation's commitment to operating its assets to achieve asset management and business objectives, with specific reference to achieving the required levels of service to its customers. The Policy is supported by the Scheme and Asset Operations Plans Guidelines. The Guideline describes the structure of scheme and asset operations plans and the responsibilities for the development of these various plans. <p>Operating Plans & Strategies</p> <ul style="list-style-type: none"> Operations Plan requirements are set out in the Scheme and Asset Operations Plans Guideline. This sets out the collection of plans to be used. The Guideline is aligned to 	<ul style="list-style-type: none"> Quick Reference Sheet - Maintaining Functional Locations #2295249, 22 March 2012 Regional Operations - Work Planning and Scheduling - Procedure for Planning #9032486, 25 March 2015 Regional Operations - Work Planning and Scheduling - Procedure for Commitment #9050583, 13 June 2013 Regional Operations - Work Planning and Scheduling - Procedure for Scheduling #9072160, 14 June 2013

Effectiveness Criteria	Evidence reviewed
	<p>Water Corporation's asset management objectives and to the IAM asset maturity framework for developing an effective Asset Management System.</p> <ul style="list-style-type: none"> Water Corporation's asset schemes are split into two main categories; basic and complex schemes. The complex schemes, which includes the IWSS, the GAR and the West Pilbara schemes, are typically where there are multiple sources to manage or where the schemes are integrated. Basic schemes include most of the regional schemes. Typically Water Corporation uses a "high-level" scheme operations plan and then a series of more detailed, complementary plans addressing the requirements of the individual components of the scheme. High Level Plans include Water Source and Treatment Plans, Water Network Plans, Wastewater Treatment and Disposal Plan (including Process Control Tables) and Wastewater Network Plans. Detailed Plans that are developed according to the specific requirements include Water Safety Plans, Water Treatment Plant Plans, Recycled Water Quality management Plans and Recycling Scheme Plans. The detailed Water Supply Plans include production plans and typically targets for a 1-3 year period. There are four different categories of Operations Plans depending on the complexity of the scheme. In increasing levels of complexity, these are: <ul style="list-style-type: none"> Monitor (for schemes that are largely automated) Plan and Monitor Plan, Monitor and Trend Control from Control Centre (for the complex schemes) These Operation Plans are initially developed for a medium to long-term overall planning timeframe by the Asset Planning group and transferred to the Operations Centre after 12 months. The Operations Centre further develop the plan by assessing the actual operating parameters to date to take account of items that need to be considered such as capital requirements, maintenance forecasts, energy optimisation, operating profiles for seasonable demand and outages. A weekly operations plan is developed each week for the forthcoming week that takes account of the overall Operations Plan and provides the Control Centre with the operating parameters, including the set points that are needed to operate the plant over the next seven day period. Water Corporation uses System Change Instructions to record the changes to the operation instructions that are provided to the Control Centre. The Process Control Tables used to provide the set point instructions for the water supply schemes are developed by the Water Quality team. The Operations Performance Group are responsible for developing 12 month Action Based Plans (ABPs) that include the work orders for the year that are required to be completed to meet the asset management and overall corporate objectives. As part of the process to develop the ABPs, the previous year's finances are assessed to estimate the next year costs. Customer requests for actions such as meter replacements and burst and leaks are

Effectiveness Criteria	Evidence reviewed
	<p>also assessed to formulate scheme targets for the upcoming year and to provide scheme budget estimates.</p> <ul style="list-style-type: none"> ▪ The day-to-day performance of the schemes is monitored to assess performance against the targets. ▪ A 6-week planning window is developed (outlined in Regional Operations Work Planning and Scheduling – Procedure) for Planning for the regional schemes which set out the operating parameters (e.g. what bores to utilise, what assets to run, etc.). ▪ The AAP – Single Page Risk Prioritisation spreadsheet provides detail of assets per prioritisation group for the document above. <p>Work Programs</p> <ul style="list-style-type: none"> ▪ Water Corporation has a Work Program Formulation Guideline that sets out the procedures for developing its O&M programs. The Guideline allows Water Corporation to align the O&M budget with the asset management and overall corporate objectives. ▪ The Work Programs are completed for each District and rolled up to Region level. ▪ The risk, asset management and corporate objectives and level of service requirements are taken into consideration in the preparation of the annual work programs. Water production is also accounted for. ▪ The generic maintenance requirements, historical maintenance activities, individual O&M plans and other support activities that are required to be undertaken (e.g. training, PPE, tool box talks, vehicles, etc.) are used to develop an Unconstrained Work Program for each scheme/facility. ▪ The last three years of corrective maintenance are considered and added to the planned maintenance program to develop a punch list that allows differences from the previous year's program to be reviewed. Unit rates are used at a district level to build up the costs for all the tasks that have been identified and these are aggregated for each scheme/facility to derive the overall program budget. ▪ The key drivers of each work program are assessed to review and confirm the groups of tasks and costs driving the plan. ▪ The last four years of actual unit rates are also reviewed to confirm that they are correct and appropriate. The unit rate data shows the time to complete the task in each district, which allows this to be compared and checked in the development of the program. The work task estimates are converted into FTEs to complete the work at a District level. The resources are broken down into different skill categories of Civils, Mechanical, Electrical and Support to identify the specific staff requirements in more detail. ▪ After the Unconstrained Work Program has been developed, the constraints are assessed in order to prepare the Constrained Work Program. The process assesses the resources that Water Corporation has available for each facility/scheme and the budget it has available to carry out the work. By comparing the Unconstrained and Constrained Work Programs Water Corporation is able to identify where additional labour and budget resources are needed to deliver the work program (or where it has surplus resources) and

Effectiveness Criteria	Evidence reviewed
	<p>this is used to develop the Balance Work Program for approval in the budget process and input of the tasks into SAP. The Constrained Work Program is essentially agreed based on the combination of available funding and risk.</p> <ul style="list-style-type: none"> ▪ If required, additional funding for a scheme/facility can be sought if the development of the Unconstrained and Constrained Work Program shows that additional resources are needed to complete the tasks that have been identified. ▪ In 2017/18, an additional \$31M was made available to allow Water Corporation to meet its Priority 1 to 5 tasks and to also complete some lower priority tasks that had previously been deferred. ▪ Water Corporation undertakes regular periodic monitoring and reporting of the O&M Work Program to assess performance against the program and the budget. ▪ We reviewed the Work Program development for the Southern Region. We confirmed that the program has been developed with input from different groups with the Corporation, e.g. Team Leaders, Works Planning, Asset Investment, and Finance. <p>Linkage to Levels of Service</p> <ul style="list-style-type: none"> ▪ Levels of Service measures and objectives are defined in Water Corporation's Asset Class Strategies. These document the levels of service performance measures and targets at the Asset Owner level and the prioritisation between levels of service. Reference is made in these documents to the Corporation's Operating Licence and Customer Charter. ▪ PCY340 Plan Scheme Operations states that the scheme operations plans are developed and maintained to "Ensure that our asset management levels of service and customer service objectives, strategies and plans are translated and communicated into operating plans to be implemented by Operations Centre and local operators, including service delivery partner Alliances." ▪ Levels of Service are also considered and referenced in asset planning and asset maintenance. <p>Water Corporation operational centre site visit</p> <ul style="list-style-type: none"> ▪ Water Corporation's Operational Centre (OC) is located at its main office in Leederville, Perth. The OC is split into three sections: Water Operations, Wastewater and Customers, and Operations Delivery. ▪ The Water Operations section of the OC manage Water Corporation's simple and complex water scheme operations. It is set up with different desks to manage the water supply production and the distribution through the network. For the simple schemes, alarms are monitored and used to create and dispatch work orders to investigate and action to the appropriate field staff. ▪ The OC also monitors the in-between schemes that are neither considered complex nor simple. This includes the GAR and the West Pilbara water supply schemes.

Effectiveness Criteria	Evidence reviewed
<ul style="list-style-type: none"> For Water Corporation's more complex water schemes, the operations managed from the Operations Centre are more in-depth. Although alarms continue to be monitored, the multi-year plan and one year horizon are used to manage the scheme in accordance with the specific Operations Plan. The annual Plan is broken down into weekly Operations Plan that set out the set points and supply requirements for the WTP and the associated water infrastructure. The OC manages the assets in accordance to the Operations Plan on a 24/7 basis. 	
<ul style="list-style-type: none"> Risk management is applied to prioritise operations tasks 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation, provided examples and interviews with key staff, we consider that Water Corporation has in place robust risk management processes that allows for the prioritisation of operations tasks. Water Corporation's uses a single system for its prioritisation, which means that it can apply the process across the whole business. In addition, it means that O&M tasks can be balanced across the regional and metro area and it can also balance the work programs with the risks and the objectives. The risks can be balanced with the available funding to show the risks associated with the tasks that are not being funded and to identify where short-term deferrals can be used. <p>Overview of Water Corporation's Operational Risk Management</p> <ul style="list-style-type: none"> Water Corporation develops its planned O&M tasks in accordance with its Planned Operations and Maintenance Prioritisation Guideline. The prioritisation process allows Water Corporation to balance risk and budgets and to identify where it can defer low priority work if required over the short term in order to accommodate budget and other constraints. Water Corporation's prioritisation process also allows for a long term view of the work program and opportunities to better manage the work load and risk over a longer period of time. Water Corporation's priorities are based on seven prioritisation categories: <ul style="list-style-type: none"> 1 – Statutory 2 – Business Licence 3 – Business Critical 4 – Extreme Risk Asset 5 – High Risk Asset 6 – Medium Risk Asset 7 – Low Risk Asset Water Corporation also has a Priority 8 category that is used as a placeholder for any requirements that are requested and do not have a related risk assessment. A prioritised task list is included in the Planned Operations and Maintenance Prioritisation Guideline. The highest priority tasks rated as 1 – 3 have a nominal rating that applies across each scheme/facility. For the lower priority tasks rated as 4 – 7, the ratings can vary depending on the specific scheme/facility that the tasks are being carried out at, e.g. some

Effectiveness Criteria	Evidence reviewed
<p>Priority 4 tasks at one scheme/facility may be Priority 7 at a scheme/facility with lower risk and less critical assets.</p> <ul style="list-style-type: none"> The planned O&M tasks and the assigned priorities form the basis of the development of the O&M Work Program. Water Corporation's prioritisation process means that the planned operations and maintenance tasks are risk-based instead of being activity-based. The prioritisation is used throughout SAP and in the development of the Work Programs for each district to look at the available resources. The information is used to monitor performance of O&M tasks each month so that the schemes can be actively managed taking account of the risks on an ongoing basis. <p>Incident Management</p> <ul style="list-style-type: none"> Water Corporation's Incident Management Policy describes the principles for the Corporation's approach to Incident Management. The policy is comprehensive and applies to all aspects and activities of the Corporation's business. In addition, Water Corporation has an Incident Management Standard (S110) which establishes the framework for management of incidents and provides the prioritised objectives to deliver a coordinated approach. The Standard includes details of the classifications, key roles, information processes and subsequent monitoring and reporting. Incident information is recorded in the WebEOC information management system. WebEOC is a web-enabled crisis information management system that provides secure real-time information sharing to help Water Corporation make sound decisions quickly. WebEOC is used by Water Corporation to record activities, actions and outcomes relating to management of incidents. Examples of incidents recorded in WebEOC were observed during the discussions with Water Corporation. Water Corporation's incident management processes are applied to all minor, major and significant events. This includes asset-related incidents but also non-infrastructure events such as ICT issues as the processes are not limited to customer service disruptions. Corrective actions or improvement opportunities are identified through testing or post-incident reviews and are recorded and managed through Water Corporation's Sentinel system to provide a corporate repository to track issues and actions. 	
<ul style="list-style-type: none"> Assets are documented in an Asset Register including asset type, location, material, plans of components, an assessment of assets' physical/structural 	<p>Summary</p> <ul style="list-style-type: none"> During our review we confirmed that Water Corporation documents its assets in an asset register. The requirements for data to be provided for updating the information in the asset registers is managed through the asset handover process. Water Corporation has a checklist that is completed when the assets are transferred to Water Corporation that includes all the requirements that need to be met and the checks to confirm that the correct information has been provided. Requirements are set out in the Asset Data Handover Guideline and a Drawings Handover Guideline. <p>Overview of Water Corporation's Asset Registers and Asset Attributes Information</p>
	<ul style="list-style-type: none"> Asset Registration SAP PM FLER Guideline #19183829, 15 August 2018 PCY208 - Identification of Engineering Assets #364849, 5 September 2016

Effectiveness Criteria	Evidence reviewed
<p>condition and accounting data</p>	<ul style="list-style-type: none"> ▪ Water Corporation's Identification of Engineering Assets Policy covers the management of the Water Corporation's engineering assets used to provide water services to customers. It excludes other Corporation assets described as Fleet, Information Technology or Intellectual Property. ▪ Water Corporation uses SAP-Plant Maintenance (PM) as its asset register for infrastructure and linear (e.g. pipe) assets. ▪ The Functional Location and Equipment Register (FLER) is hierarchical register of functional locations within the SAP – PM module that is used for asset identification in the performance of works management. Assets are recorded in SAP with Functional Location descriptor. The Functional Location is unique identifier assigned within SAP to an asset class according to standardised rules. A functional location (FL) represents the place at which a maintenance task is performed, either as an asset facility, a process module, an equipment item or a street address. ▪ Some of the asset information documented in the FLER is as follows: <ul style="list-style-type: none"> – Functional Location – Description – Class Type (numeric) – P/S Design Name – Power Meter Number and Power Tariff – Alarm Phone Number – Station ID – Overflow Storage (Yes/No) – Total Emergency Storage (quantity and unit) – Overflows To (e.g. "River") ▪ Linear assets are also registered in Water Corporation's GIS. SmallWorld is used for the GIS, with ESRI used as a spatial data analytical and reporting tool. Links to customer information such as water meter information can be achieved through land records registered in the GIS, ▪ The following asset information is documented in SmallWorld: <ul style="list-style-type: none"> – Functional Location (linkage with FLER) – SAP Name – Date Installed – Status – Type – Name – Number

Effectiveness Criteria	Evidence reviewed
	<ul style="list-style-type: none"> – Owner – Private (ownership) Indicator – Planset Number – CAR Asset ID (Corporate Asset Register) <ul style="list-style-type: none"> ▪ Water Corporation's Asset Registration SAP PM FLER Guideline outlines the process, management, and accountabilities for the timely registration of asset information into the FLER and the GIS Asset Register (the Facilities Mapping System (FMS)) ▪ Water Corporation has a separate Financial Fixed Asset Register (FFAR) registered within the SAP Asset Accounting Module. Financial assets are recorded to represent the capitalised value of assets to be depreciated throughout their useful life. Under Water Corporation's capitalisation rules, a financial asset represents a physical asset which has a useful life of at least three years and a capital value greater than or equal to \$2,000. ▪ The majority of assets added to the FFAR over the last 2 years have been registered on a one-to-one basis between the asset records in the maintenance and financial modules, although legacy assets are not as well mapped. ▪ Water Corporation's Asset Registration team are responsible for updating the asset register information. This is achieved through As Constructed drawings and notes from the field recorded on work orders for asset replacements and repairs. Asset drawings are stored in Water Corporation's Document Management System (DMS) and there is an interface between the DMS and SAP to access the relevant information from the two systems. ▪ Water Corporation is planning to implement a new DMS in March 2019. This will improve the interface between the DMS and SAP asset information as the updates between the two systems have to be carried out manually at the current time. ▪ Water Corporation has an Asset Data Handover Guideline and a Drawings Handover Guideline. The requirements for data to be provided for updating the information in the asset registers is managed through the asset handover process. Water Corporation has a checklist that is completed when the assets are transferred to Water Corporation that includes all the requirements that need to be met and the checks to confirm that the correct information has been provided. ▪ Water Corporation reviews its asset lives and revises these if required. This may include depreciating an asset over less time if it is located and operating in a more aggressive environment. Recently Water Corporation has reduced the asset life of some valves and reticulation assets because of this. Alternatively, Water Corporation increases the asset life if it has identified that it can operate to meet expectations and requirements over the longer time than had initially been envisaged. Water Corporation has recently revised the nominal asset life assigned to its SCADA assets from 12 to 15 years. ▪ Some asset condition information is recorded in SAP but generally this is recorded in the System Capability Matrix (SCM). The SCM is an intranet information portal maintained by the Capability Assessment Section. The SCM provides the ability to view the level of risk in each of the Corporation's asset systems throughout the State. The SCM provides a consolidated view, drawn from various corporate systems, of current and future risk at a

Effectiveness Criteria	Evidence reviewed
	<p>system level and of risk factors and proposed risk treatments. Using SCM, Water Corporation is able to detect where there are gaps in either risk assessments or risk treatments. It is also used as the tool for establishing the criticality of the schemes.</p> <ul style="list-style-type: none"> We viewed the GIS during our discussions with Water Corporation and confirmed that the asset register in the FMS included date of construction, length of pipe, specifications (material and diameter) and the functional location ID to link the asset to the information recorded in SAP.
<ul style="list-style-type: none"> Operational costs are measured and monitored 	<p>Summary</p> <ul style="list-style-type: none"> Based on the evidence provided to us and the interviews with key staff, we confirmed that Water Corporation measures and monitors operational costs for its assets. <p>Overview of Operational Costs</p> <ul style="list-style-type: none"> Operational costs for each scheme are recorded in SAP against the different tasks and actions. Costs are also reported through SAP. Water Corporation's Micro Planning Guideline for Operational Budgets provides the processes for developing the operational budgets for the schemes. Budgets are built from SAP financial data. The budgets are developed bottom-up and can be aggregated to provide the overall budget for each facility or scheme. The data that is included in the preparation of the budgets includes costs for labour, chemical, energy, materials and alliance costs. Operational costs are monitored through the monthly Business Performance Report process via Water Corporation's Cascade system. The reports provide a snapshot of revenue and costs. In addition, quarterly reviews against the Water Production Strategy and Annual Operations Plan are carried out to assess performance against the annual budgets. Operational costs are reported through Activity Based Planning (ABP) Reports. The reports interrogate the data recorded in SAP and are able to present the data in the number of different ways, e.g. by business area or activity code. The ABP reports include the cost information for the alliances as well as for Water Corporation's metro area and the Regions. The alliances use the ABP reports more than they used to, when the SAP-FICO (Finance Controlling) module was the primary system used for the cost data associated with operating the alliance-managed schemes (FICO Quick Reference Sheet – Financial Master Maintenance – Accounts Cost Elements CE Groups). The data included in the ABP reports is analysed monthly and used to update the operational plans. Examples of operational costs in SAP and reported in the ABP Reports were confirmed during the onsite interviews.
	<ul style="list-style-type: none"> Examples of Activity Based Planning (ABP) Reports. FICO Quick Reference Sheet - Financial Master Data Maintenance - Accounts_Cost Elements_CE Groups #824139, 11 September 2018

Effectiveness Criteria	Evidence reviewed
<ul style="list-style-type: none"> Staff resources are adequate and staff receive training commensurate with their responsibilities 	<p>Impact of the Capital Program on Operating Expenditure</p> <ul style="list-style-type: none"> A Financial Impact Statement is prepared for each Business Case that includes the lifecycle costs for the assets. The Financial Impact Statement is input into the budget for the years that the lifecycle costs impact. Maintenance tasks and costs uploaded into SAP are ranked in accordance with Water Corporation's prioritisation categories for planned O&M tasks. When Work Programs are developed each year, the tasks are reviewed and updated as required.
<ul style="list-style-type: none"> Staff resources are adequate and staff receive training commensurate with their responsibilities 	<p>Summary</p> <ul style="list-style-type: none"> We consider that Water Corporation's staff resources are adequate and staff receive training commensurate with their responsibilities. Workforce planning is used to identify resource needs and detailed work schedules are used to identify staff numbers to operate and maintain the assets. Training and organisational development is unpinned by specific policies and a learning management system is used to assign and monitor staff training requirements <p>Overview of Water Corporation's staff resource management and training</p> <ul style="list-style-type: none"> Water Corporation's Corporate Training and Organisational Development Policy defines the corporate approach in relation to accountability and responsibility of each business area to employee training and development. The policy applies to all training and development activities undertaken within the Corporation and where applicable, its partners/alliances and contractors. The policy is underpinned by Water Corporation's Corporate Training and Organisational Development Standard which has been developed to ensure that the compliance policy principles associated with Process Owners / Managers / Delegates and employees are adequately and effectively implemented and monitored. Water Corporation's learning management system (LMS) is Tracers. The system is used to assign training courses to staff and monitor and report on attendance and progress. Individual staff can access their training records through Tracers and view the training that has been assigned to them and whether it has been completed, is coming up or is overdue. Training requirements and processes can also be aligned to specific assets to ensure that the required training to operate and maintain the asset is carried out. This is included in the support services that are required when the annual Works Programs are being developed. Water Corporation's training is carried out under a national framework. All 65 in-house courses that Water Corporation runs are accredited by TAFE and TAFE provide the qualifications. Each member of Water Corporation has a specific learning management profile. Training needs are reviewed with managers as part of the Corporation's annual staff review process. The annual review process is linked to the performance agreement contract. Some of the

Effectiveness Criteria	Evidence reviewed
	<p>training is mandatory (e.g. safety management) while other training is job-specific and provided as required.</p> <ul style="list-style-type: none"> ▪ The Aroona Alliance utilises Water Corporation's learning management although it also has its own systems and processes. Monthly training reports are provided to the Corporation as part of the contractual requirements. ▪ Water Corporation has developed a competency framework across the business to ensure that it has the core competencies that it requires. These have been assessed across the Corporation are aligned with the IAM requirements for competency to meet the ISO55001 requirements. ▪ Water Corporation has an Asset Management Technical Competencies and Proficiencies document that aligns specific profiles for roles within the Corporation against the required competencies using a five level competency grading scale. In total there are 34 competencies that are assessed. Progression maps are used to identify training requirements with the Corporation. ▪ Water Corporation uses workforce planning and assess the capability baseline against projects and initiatives that have been planned and are being progressed to assist in making resourcing decisions so that it can look to bring any specific competencies into the Corporation at the right time. ▪ Water Corporation uses a Master Schedule based on the history of work orders to calculate how much work is being completed each year, and adds in the time allocated to training, holidays and other work activities. The Master Schedule is used to calculate how many FTEs the Corporation needs and this is compared against the labour included in the operating budget to identify whether the Corporation has adequate resources. Similarly, the Aroona Alliance assesses the hours of operations needed to operate and maintain the assets it manages under its contract with Water Corporation and matches this up with the staff resources that it has available or uses this to identify where additional staff resources may be required. Training costs is built into the budget at the start of year for field and alliance staff. ▪ Water Corporation has started to develop a three year view of its staff resources and the skills and competencies so that it can prepare for future succession planning with the Corporation. ▪ The Unconstrained and Constrained Work Program process is used to identify existing staff/resource gaps and this information is used to seek additional funding for resources and to look where there are surplus resources that could be utilised if required. ▪ Water Corporation has completed scenario resource planning that looks at the budgets and the priority tasks that need to be completed to assess what would happen if it had 20% less resources to carry out the work.

5.6 Asset maintenance

Table 5-6 Asset Management System Review Observations for Asset Maintenance

Effectiveness Criteria	Observations	Evidence reviewed
Asset maintenance		
<ul style="list-style-type: none"> Maintenance policies and procedures are documented and linked to service levels required 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation and interviews with key staff, we consider that Water Corporation's maintenance policies and procedures are documented and linked to service levels required. We have recorded our observations below under the following sub-headings: <ul style="list-style-type: none"> Maintenance Policy Asset Maintenance Guidelines Maintenance Standards Development of Asset Maintenance Activities Maintenance Planning Linkage to Levels of Service <p>Maintenance Policy</p> <ul style="list-style-type: none"> Water Corporation has a Board Position Statement for Maintenance. This policy establishes the maintenance management principles and informs the objectives to manage and maintain the assets for the benefit of Water Corporation's customers, community and the State Government as owner. Plan Asset Maintenance Guideline is the overarching policy for the maintenance of the Corporation's water and wastewater schemes and supporting assets. Water Corporation's Plan Asset Maintenance Guideline is aligned to the Board Position Statement, Maintenance Policy and the Asset Management Strategy. The Guideline provides details of the Plan Asset Maintenance Framework and describes the processes and sub processes to develop, implement, review, monitor and continuously improve Water Corporation's approach to asset maintenance to achieve its asset management objectives. Therefore, the Guideline also has touch points with Water Corporation's other key asset management documents, including Plan Assets, Plan Asset Operations, Plan Asset Contingency Operations, and Plan and Investigate Asset Renewals. <p>Asset Maintenance Guidelines</p> <ul style="list-style-type: none"> Water Corporation's Plan Assets Framework provides a clear line of sight from the corporate strategy to the asset strategy, policy and strategic plan making that articulates levels of 	<ul style="list-style-type: none"> #BPS10 Maintenance (# 16305707) (version date 19 Dec 2016) Asset Maintenance Requirements FMEA-RCM Guideline (# 172019880) (version date 16 Oct 2017) Plan Asset Maintenance Process and Guideline (# 19747766) (version date July 2018) Plan Assets Framework #15643272 13 September 2018 Asset Management Strategy 2018-2038 (# 20186938) April 2018 Maintenance Standard Register (# 825046) Planned Operations and Maintenance Prioritisation Guideline #19738138, 04 July 2018 Regional Operations - Work Planning and Scheduling - Procedure for Planning #9032486, 25 March 2015 Regional Operations - Work Planning and Scheduling - Procedure for Commitment #9050583, 13 June 2013 Regional Operations - Work Planning and Scheduling - Procedure for Scheduling #9072160, 14 June 2013 Planned Operations and Maintenance Prioritisation Process Guideline (# 19738138) (version date 4 July 2018) ##S-CL-CV-2018 Gravity Sewer Asset Class Plan (ACP) #19375983 Operations and Maintenance Planned Activities Business Case 2018-19 #19353443, 29 May 2018

Effectiveness Criteria	Observations	Evidence reviewed
	<p>service. These plans and the levels of service provide Water Corporation with the key criteria and informing strategies that define the gateway into its asset investment planning.</p> <ul style="list-style-type: none"> Water Corporation has a Planned Operations and Maintenance Prioritisation Guideline that sets out the Corporation's task based prioritisation process that it uses to balance the requirements of delivery risk and budgets. The guideline outlines the process of allocating work priority to planned maintenance and planned operational work (based on risk) and describes the logic used. In addition, Water Corporation has an Asset Maintenance Requirements FMEA/RCM (Failure Mode Effects Analysis/Reliability Centred Maintenance) Guideline, which is linked to its Asset Handover Guideline, which aims to identify maintenance requirements for assets created through Water Corporation's asset acquisition process, show how this links with other asset acquisition process outputs and understand costs associated with ongoing maintenance. In particular, it provides guidance to performing FMEA/RCM for defining such requirements. <p>Maintenance Standards</p> <ul style="list-style-type: none"> Water Corporation has Maintenance Standards for different asset types. The maintenance standards specify the maintenance strategy for the specific asset and provide direction on what is required for each asset type. The Standards are used to build the maintenance programs for the assets. Water Corporation maintains a register of its published and approved maintenance standards The Maintenance Standards take into account strategic considerations, business drivers, business constraints, operating licences, statutes, regulations, by laws standards, industry best practice, and operational constraints. They are used to establish a "Best Practice" (as defined by Water Corporation) maintenance plan, which reflects the intent of the business and is embedded into Water Corporation's Maintenance Management system. Aroona uses Water Corporation maintenance standards to ensure that assets are maintained to provide the required licence targets and service levels. For non-standard assets, the supplier's manuals and recommendations are used to develop appropriate maintenance standards. The maintenance regimes for non-standard assets are developed within Water Corporation, taking into consideration the criticality of the asset taken. Water Corporation is currently developing a Maintenance Tactics database which will assist in developing maintenance work orders and standard work instructions (SWIs). This database will be ready for use in 2020. <p>Development of Asset Maintenance Activities</p> <ul style="list-style-type: none"> Maintenance activities are built using a bottom-up process that looks at the components/individual assets within a facility/scheme. These is developed using the asset information recorded in the asset register and the functional location information. The maintenance activities are compiled into work orders, built into packages of work to be completed and loaded into SAP with a priority based on the risk. 	<ul style="list-style-type: none"> PCY328 Corporate Training and Organisational Development (# 1991393), 07 October 2016 Corporate Training and Organisational Development Standard (S471) #9137516, 05 October 2016#

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Water Corporation's process also considers reactive maintenance that has been undertaken historically on an asset, or for new assets having a maintenance plan developed for the first time on a similar asset maintenance plan. This ensures the resources, time and costs can be accounted for in the budget and included in the development of the Work Program. The planned maintenance profile process using the Priority 1 to 7 scale that has been outlined in the Prioritisation of Planned Operations and Maintenance section under the Asset Operations section. The Unconstrained/Constrained Work Program process, as outlined in the Asset Operations section, is used to look at what activities it can fund and resource and then either requests for additional funding or resources to be provided or revises the work program to defer any lower priority tasks in the short-term. The maintenance task development principles apply to the Corporation and the alliances. Although Water Corporation does not have the same visibility over the Aroona Alliance's maintenance activities, the principles are essentially identical. Although Aroona's risk process is the same for the higher risks, it has a slightly different process for the lower risks. <p>Maintenance Planning</p> <ul style="list-style-type: none"> The Planned Operations and Maintenance Prioritisation Process Guideline outlines the approach to how maintenance tasks are prioritised. The prioritisation process also allows for a long term view of the work program and consistency in approach across activity types. The guide outlines the process of allocating work priority to planned maintenance and planned operational work (based on risk). <p>Linkage to Levels of Service</p> <ul style="list-style-type: none"> The various Work Instructions referred to in this section of the report outline an asset criticality assessment. Within this, LoS is referred to: <i>the Asset Class Strategies and Plans contain the intervention triggers and method preferences (including performance monitoring) based on the asset criticality and the risk (i.e. criticality x likelihood of failure) the asset poses to impacting on its ability to deliver the required LoS. The following factors (i.e. consequences of failure) are used in determining the criticality of the asset:</i> <ul style="list-style-type: none"> Safe Reliable Compliant Cost Effective. <p>Therefore, the assessed risk provides the link between level of service and the maintenance strategy for the asset.</p>	

Effectiveness Criteria	Observations	Evidence reviewed
Regular inspections are undertaken of asset performance and condition	<p>Summary</p> <ul style="list-style-type: none"> We confirmed that Water Corporation undertakes regular inspections of its assets for performance and condition. The Corporation had an ongoing program of asset condition assessments and ad hoc inspections are also carried out. There are a number of different approaches used to identify assets for inspection, including changes in performance, failures, changes in scheme planning and opportunistic inspections. Asset condition and performance databases and sewer pipe condition mapping was provided as evidence. <p>Overview of Water Corporation's Asset Inspections</p> <ul style="list-style-type: none"> Water Corporation's Manage Asset Condition Guideline describes the Corporation's end-to-end process of identifying risks related to asset condition, planning and executing Asset Condition Assessment (ACA) and managing and utilising the asset condition data. Water Corporation has a Manage Asset Deficiency process that describes how a deficiency can identified either reactively by operational or other staff, or proactively via the Asset Performance Monitoring process, how it is recorded and managed and how it is documented for further assessment in the Asset Investigation Process. Water Corporation has an ongoing program of asset condition assessments. Level 1 inspections are completed as part of the annual preventative maintenance inspection program and can be used to record any issues. Level 1 inspections can result in rectification works although this is more expected from the Level 2 inspections. Typically, the Level 2 inspections are based on the initial Level 1 inspection. Level 2 inspections are risk-driven, are more intrusive and only carried out on high risk assets by suitably qualified staff or specialist contractors. Examples of Level 2 inspections include taking tanks offline to take core samples for testing to identify the remaining asset life and taking pipes offline to conduct intrusive analysis. Water Corporation's asset condition assessment process flow diagram is set out in the Manage Asset Condition Guideline. This process establishes the methodologies to be used, identifies the candidates for assessment, uses a risk-based prioritisation before the scoping and planning phase in order to finalise the assessment and apply for funding to complete the work. After the condition assessment has been completed, the outcomes are reviewed and the collected data managed. If asset deficiencies are identified, Water Corporation implements its Plan Asset Investigation process, and, where applicable, this leads into prioritised planning to replace or renew the deficient asset. Ad hoc and opportunistic asset inspections are also included in the flow diagram. Water Corporation's mobile computing system allows asset condition to be recorded in the field during normal maintenance activities. Water Corporation identifies candidates for inspection through a number of different sources, including: <ul style="list-style-type: none"> Periodic operational inspections where deficiencies are identified and reported through the deficiency process. 	<ul style="list-style-type: none"> Monitor Asset Performance Work Instruction (# 19581781), 14 September 2018 Manage Asset Condition Guideline (# 8717283) (version date 11 September 2018)#

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Changes in scheme planning that may identify the need to upgrade or replace an asset. Modelling of asset life based on deterioration factors using decision support tools. An ACA may be triggered proactively where an asset has a high consequence of failure and is therefore critical to operations. Opportunistic inspections can be triggered where an asset is taken offline for other purposes and it is convenient to carry out an intrusive ACA. Asset Failures, failure trends or poor condition may indicate the need for renewal and may therefore trigger an ACA. <ul style="list-style-type: none"> Proposed inspections take account of other stakeholders within the Corporation. The Control Centre provide input to confirm that the asset can be accessed at the time that is being proposed. We reviewed the Corporations' Concrete Tanks Inspection database that it uses to record asset condition and, based on this data, calculate the asset's remaining life. The frequency of the inspections are based on the tank cleaning frequency. Water Corporation has similar inspection databases for its steel tank assets and sewer pumping stations. Water Corporation has developed remaining life profiles for its water tanks that use a matrix of risk to identify where the highest risks are and overlays this with the maintenance work that it is carrying out. We viewed the wastewater collection condition heat map that Water Corporation uses to estimate the condition of the sewer pipes based on overflows, maintenance work orders, pipe material and soil types. By using this information to identify sections of pipes where the condition may be poorer, Water Corporation can identify sections for further assessment (e.g. CCTV surveys for the sewer pipes). Combining this information with defects and work order issues, Water Corporation is able to evaluate rectification options and develop cost estimates to carry out any remedial work. 	
<ul style="list-style-type: none"> Maintenance plans (emergency, corrective and preventative) are documented and completed on schedule 	<p>Summary</p> <ul style="list-style-type: none"> Based on the evidence that was observed during the review, we confirmed that Water Corporation's maintenance plans are documented and completed on schedule. Examples of Water Corporation's planning and scheduling tools were assessed during the site visits, with operational and maintenance tasks audited back to the original work orders in SAP to confirm that the tasks had been completed. <p>Overview of Water Corporation's Maintenance Plans</p> <ul style="list-style-type: none"> Refer to the Maintenance Planning section above. Activity Based Planning KPIs are reported and this includes reporting on work order information and the priority of the associated tasks to review what has been completed and what activities have not been completed. This information is included in the monthly Business Performance Report. 	<ul style="list-style-type: none"> Maintenance work orders in SAP Regional Operations - Work Planning and Scheduling - Procedure for Planning #9032486, 25 March 2015 Regional Operations - Work Planning and Scheduling - Procedure for Commitment #9050583, 13 June 2013 Regional Operations - Work Planning and Scheduling - Procedure for Scheduling #9072160, 14 June 2013

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> In the 2015 review report we noted that Water Corporation had experienced some issues in the Regions related to completing maintenance work orders on time, achieving a much lower level of performance than Water Corporation achieved in its metropolitan areas and was achieved by its alliances. Water Corporation identified that in some cases the regional maintenance contractors were completing lower priority maintenance tasks quicker than some of the high priority tasks. In some cases, these work orders were being cancelled and rescheduled. This was considered by Water Corporation to be predominantly due to either staff completing preferred work tasks or the extensive travel time to some locations, meaning that maintenance tasks needing to be completed were maximised in order to make the most of the time on site. It was not considered to be an issue related to available staff resources or staff with particular maintenance specialism. Since the last review Water Corporation has improved performance against the performance indicator for completing maintenance work orders within the required timeframe in the regions. Water Corporation considers that the improvements have been driven by a more transparent maintenance planning process and a better build-up of the Work Programs. This has been driven by the risk-based process to prioritise maintenance tasks that Water Corporation has embedded since 2015 and which are developed in consultation with the various stakeholders within the Corporation. If the higher priority tasks in the Work Program for a scheme/facility cannot be completed they are rescheduled. If there is no risk Water Corporation may cancel the task and may or not reschedule it. If it is not rescheduled, it is completed on the next maintenance cycle for the task. The Operations team need to provide reasons for a work order not being completed. If a work order task is not completed, Water Corporation use risk to decide how to reinvest the money that has been saved by not completing the task. 	
<ul style="list-style-type: none"> Failures are analysed and operational / maintenance plans adjusted where necessary 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation, provided examples and interviews with key staff, we confirmed that Water Corporation analyses failures and adjusts its operational and maintenance plans where necessary. Examples of failure analysis for pipes assets were presented during the review. This data is used to identify changes to maintenance requirements and, where required, can also result in the development of renewals and replacement capital projects. <p>Overview of Water Corporations Asset Failure Analysis</p> <ul style="list-style-type: none"> Water Corporation has a Plan Asset Investigation process that describes how asset failures or emerging asset risks are investigated and resolved to ensure Asset Management Objectives are achieved. This Work Instruction provides clarity and direction to Asset Investment Planning and operational teams engaged in asset investigations as well as those teams accountable for inputs and outputs to the process. The Work Instruction also provides context with respect to the Plan Assets Framework and the Triage process. 	<ul style="list-style-type: none"> Plan Asset Investigations Work Instruction (# 9581984) (version date 14 September 2018) Manage Asset Deficiency Work Instruction (# 19578084) (version date 14 September 2018) Examples of meale maps from NetMaps Alarm and asset failure data recorded in SAP

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Water Corporation have a work instruction for managing asset deficiency, which describes how a deficiency identified either reactively by operational or other staff, or proactively via the Asset Performance Monitoring process, is recorded and managed and how it is documented for further assessment in the Asset Investigation Process. Asset failure information recorded in SAP is assessed on a monthly basis. This failure information includes repeat alarms/faults, review of replacement programs for obsolete assets and multiple occasions of attendance to the same asset. Water Corporation completes Root Cause Analysis (RCA) investigation on major/repeat failures when necessary. RCM Turbo is currently the preferred software at Water Corporation to carry out FMEAs. Water Corporation uses its GIS data for a reporting tool termed 'X marks the spot'. Work order asset and geo-spatial information is uploaded into the Corporation's FMS to allow identification and analysis of multiple faults on the same assets or the same section of a liner asset. The location of the fault is identified by the field crews on their mobile devices. The 'X marks the spot' process has been improved since the 2015 asset management review. Water Corporation has developed hydraulic, geographic and alarm profiles of whole pipe lengths to show where the maintenance work orders have taken place and also where capital expenditure projects have been completed. Measle maps are created to identify assets where a capital project may be required to rectify an issue and where it may be more cost effective to complete a renewal of an asset than to keep incurring repeat maintenance. For wastewater faults (e.g. blockages, overflows) the manhole location is used to identify the assets with multiple faults. 	
<ul style="list-style-type: none"> Risk management is applied to prioritise maintenance tasks 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of the associated documentation, provided examples and interviews with key staff, we consider that Water Corporation has in place robust risk management processes that allows for the prioritisation of maintenance tasks. Water Corporation's uses a single system for its prioritisation, which means that it can apply the process across the whole business. In addition, it means that O&M tasks can be balanced across the regional and metro area and it can also balance the work programs with the risks and the objectives. The risks can be balanced with the available funding to show the risks associated with the tasks that are not being funded and to identify where short-term deferrals can be used. <p>Overview of Water Corporation's Risk Management for Maintenance</p> <ul style="list-style-type: none"> The evidence provided during the review demonstrates that Water Corporation uses risk management to prioritise maintenance tasks. As outlined previously in the Asset Operations section, Water Corporation develops its planned O&M tasks in accordance with its Planned Operations and Maintenance Prioritisation 	<ul style="list-style-type: none"> Planned Operations and Maintenance Prioritisation Guideline #19738138, 04 July 2018 #Plan Scheme Operations Policy (PCY340) #3955868, 21 May 2018 Manage Asset Condition Guideline (# 8717283) (version date 11 September 2018) Plan Assets Framework #15643272 13 September 2018

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Guideline and the seven priority levels that it has embedded across its asset management processes.</p> <ul style="list-style-type: none"> ▪ The prioritisation process allows Water Corporation to balance risk and budgets and to identify where it can defer low priority work if required over the short term in order to accommodate budget and other constraints. ▪ Water Corporation's prioritisation process also allows for a long term view of the work program and opportunities to better manage the work load and risk over a longer period of time. The process also allows Water Corporation to focus on the areas of highest criticality and also provide evidence to allow the executive to see where investment is needed. ▪ Within the various work instructions referred to above, asset criticality assessment is outlined, the Asset Risk Framework (refer to the information provided in Section 5.4 on Environmental Analysis) defines the process by which criticality is assigned to an asset. The Asset Class Strategies and Plans contain the intervention triggers and method preferences based on the asset criticality and the risk the asset poses to impacting on its ability to deliver the required Level of Service. The following factors (i.e. consequences of failure) are used in determining the criticality of the asset: <ul style="list-style-type: none"> – Safe – Reliable – Compliant – Cost Effective. ▪ If the asset is assessed as critical, it will require performance monitoring. As part of performance monitoring, data collection and performance criteria are defined to ensure that the collection of relevant asset performance data and setting thresholds that will trigger the need for an Asset Deficiency Report (ADRep). This report may lead to a review of an associated Asset Risk Assessment (ARA) or System Risk Assessment (SRA). Performance data cover some or all of the following: <ul style="list-style-type: none"> – Asset condition – Demand data (growth or decline). – Asset reliability/operating performance – LoS data 	
<ul style="list-style-type: none"> ▪ Maintenance costs are measured and monitored 	<p>Summary</p> <ul style="list-style-type: none"> ▪ Based on the evidence provided to us and the interviews with key staff, we consider that Water Corporation measures and monitors maintenance costs for its assets effectively. Cost data is recorded in SAP and there is a comprehensive suite of reporting tools and regular reports to monitor them. Financial summary reports and variance reports are prepared for each scheme on a weekly basis with monthly Work Performance Reports also developed to provide a detailed bottom-up view to compared actual maintenance costs against budgets. 	<ul style="list-style-type: none"> ▪ Monitor Asset Performance Work Instruction (# 19581781) (version date 14 September 2018) ▪ One Pathway to Investment Guideline #19993477, 4 July 2018 ▪ Examples of ABP Reports for Operating Expenditure

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Overview of Water Corporation's Measurement and Monitoring of Maintenance Costs</p> <ul style="list-style-type: none"> Water Corporation has a 'One Pathway to Investment' guideline which outlines how <i>'the application, endorsement and authorisation of investment funding requirements are managed within capital and operating financial business rules'</i>. The process and associated system has been designed to accommodate the concept of planned and reactive investment needs to ensure appropriate action is taken whilst costs are captured in accordance with the correct financial process and business rules. Water Corporation's SAP-PM module has cost objects which allows Water Corporation to break up maintenance cost into the different types of maintenance, e.g. corrective, preventative, emergency. Aroona and Perth Region Alliance both use the same systems as Water Corporation (e.g. SAP, Activity Based Planning (ABP) Reports). Water Corporation also uses SAP cost and resources information from completed work orders to develop unit rates for the costs of carrying out different maintenance and operational tasks. This information is used to develop Water Corporation's annual work programs. Water Corporation has developed a Top 25 Unit Rate Report that it uses to review and identify the main drivers for each of the unit rates based on the individual components, e.g. traffic components, reinstatement costs, specific tasks with the developed unit rate. Maintenance costs are included in Water Corporation's monthly Business Performance Reporting to the Executive. A list of all of Water Corporation's financial reports is included in the Management Operating System Activity List. Water Corporation has a series of one page Financial Performance summaries for each of its schemes that is used to provide a weekly overview. We reviewed the Goldfields and Agricultural Region (GAR) Finance Performance Report and observed that it included an overview of costs and tasks, the Top 5 Activity Based Planning tasks that had been completed, details of labour and fleet used and information on strategic planning activities. We also reviewed the GAR Operational Variance Report which reports the top 25 variances for individual tasks completed against the unit costs that were used in the annual budget preparation for the scheme. The variance reports are developed for each scheme. They are discussed at a district level between the Asset Planning, Operations and Finance teams within Water Corporation to look at the issues and to review the completed work costs against the number of tasks completed. Water Corporation also prepares monthly Work Performance Reports which summarise the performance against the annual Work Program for each scheme. This is rolled up to district level to allow Water Corporation to look to understand what is happening from a bottom-up view of the variance between the actual costs and those included in the budgets. The data includes both labour and non-labour costs. 	<ul style="list-style-type: none"> SAP Work Orders Asset Management dashboard within Water Corporation's web reporting portal

5.7 Asset management information system

Table 5-7 Asset Management System Review Observations for Asset Management Information Systems

Effectiveness Criteria	Observations	Evidence reviewed
Asset management information system		
<ul style="list-style-type: none"> Adequate system documentation for users and IT operators 	<p>Summary</p> <ul style="list-style-type: none"> Based on the information reviewed – available both online through Water Corporation’s internet and available through other channels such as Local User Experts and the IT service provider, we are satisfied that Water Corporation has in place sufficient documentation for users and system operators. <p>Overview of Asset Information Systems</p> <ul style="list-style-type: none"> The Asset Information Applications webpage outlines a number of other software systems in use at the Corporation. These systems are also listed on the Asset Data and Information Strategy webpage, where they are linked through a conceptual overview diagram. Water Corporation uses SAP as its primary information system and Enterprise Resource Planning (ERP) tool. This was first implemented in the late 1990s and has been highly customised to fulfil Water Corporation’s business needs. Water Corporation uses SAP for its asset register, finance (SAP-FICO module), maintenance management system, maintenance planning (SAP-PM module) and HR activities. The SAP BW (Business Warehouse) module collects data from SAP (CMR (Corporate Management Report), Human Resources and SAP PM), FMS (GIS) and Grange (customer information and general utility statistics) for reporting purposes. SmallWorld is used for the GIS, with ArcGIS used as a spatial data analytical and reporting tool. SAP and the GIS are linked. Grange is the customer management system. This is not integrated with SAP and Water Corporation is currently looking to replace the system. Water Corporation uses a mobile computing system to record field data and this is integrated with SAP to allow asset information to be accessed and updated. SCADA is used for the monitoring of asset performance. PI (Process Information) is also used for extracting data for reporting and analytical purposes. Water Corporation has a System Risk Assessment tool that it uses for asset risk management. It also utilises a System Capability Matrix (SCM) for its risk assessments. The System Capability Forecasting (SCF) Application is a tool used for capability planning. This brings together various data sets to help inform planning. 	<ul style="list-style-type: none"> Live demonstration of Business Systems area on the intranet Review of the following quick references guides located on the intranet: <ol style="list-style-type: none"> “Enter work start and end times without allocating costs” “Maintaining functional locations” #20366278 - Explanation of maintenance of currency of LUE list #20365789 - Explanation of training for support staff #18325316 - BPS11 Data and Related Technology Governance Principles #17141960 - External Specification – B10201 – Customer Details for Account

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Water Corporation's alliance partners also have access to and utilise the Business's SAP system. Arroona's IT systems are predominantly those used by the Water Corporation. Perth Region also uses a Business Warehouse/Business Objects reporting system. <p>User Documentation</p> <ul style="list-style-type: none"> Water Corporation stores user documentation for users in system operators on the Business System page of the intranet. We reviewed these intranet pages at the review meeting. We saw that the user documentation includes quick reference sheets. We drilled down onto the support material for Activity Based Planning and reviewed the reference sheets for the following user tasks: <ul style="list-style-type: none"> “Enter work start and end times without allocating costs” “Maintaining functional locations” The Business Systems intranet page also advises users that they can gain support from the following avenues: <ul style="list-style-type: none"> By completing a service request form By contact Local User Expert By contacting the IT service desk We followed the link for the Local User Expert option. This provided a list of names to contact for this particular subject area. We queried whether these user lists were kept up to date. Water Corporation responded that the Local User Expert list is contained with IT Self Service Areas. The lists were previously updated quarterly based on an export from IT Self Service. The lists were provided for review to Business System Analysts, Business Partner representatives as well as the Local User Experts to check the currency of the list. Water Corporation advised that this process changed in July 2018 so that the lists are now updated six-monthly and that the process to check the currency of the list is led by Business System Analysts. Water Corporation noted that the lists can also be updated at any time by request. For system operators, operation and maintenance manuals for systems are typically developed and handed over to manage the system through its lifecycle. We requested Water Corporation to provide more detail on the support provided to system operators for the Grange customer information system. Water Corporation advised that three levels of support are provided: <ul style="list-style-type: none"> Level 1 Support – the IT service provider Kinetic IT via the first level of support by taking and capturing issues, and assigning higher levels of support as appropriate. Level 2 Support – provided by Customer and Community Group. Support staff rely on External Specifications to support Grange. These specifications are also used as a basis for training. The specifications are stored in Aqua folders and are locked down for access only by the support teams. Note that the training in this regard is mentoring/coaching based, not curriculum/formal training. Water Corporation provided a screenshot identifying 22 of these specifications that form user documentation. We were also 	

Effectiveness Criteria	Observations	Evidence reviewed
	<p>provided with the specification for 'Customer details for account' (Specification B10201v108) as an example.</p> <ul style="list-style-type: none"> – Level 3 Support – is provided by an external software company. 	
<ul style="list-style-type: none"> ▪ Input controls include appropriate verification and validation of data entered into the system 	<p>Summary</p> <ul style="list-style-type: none"> ▪ While Water Corporation has sound policy and standards in place for the validation and verification of data, the evidence of persistent problems with the quality of work order data as measured against Water Corporation's own measures of success suggests that performance requires improvement. Accordingly, we have assigned a performance rating of 2 for this effectiveness criterion. <p>Overview of Water Corporation's Data Verification and Validation Processes</p> <ul style="list-style-type: none"> ▪ The Board Position Statement for Data and Related Technology Governance Principles sets out the principles that govern Water Corporation's data and related technology assets. The Position Statement includes the following principles relating to the verification and validation of data: <ul style="list-style-type: none"> – [we will] maintain Data and related technologies to ensure currency, relevancy and agility – [we will] provide robust technology and quality data to enable a culture of data driven decision making. ▪ Water Corporation's standard on Information Management Data is intended to provide a framework for corporate information management and to direct business users and other stakeholders in the application of data management controls across the information lifecycle. Data quality is within the scope of this standard and the standard specifies the following minimum characteristics of data management to achieve data quality <ul style="list-style-type: none"> – Accuracy - Describes the degree to which the captured value represents the true value. – Relevance & Trust – refers to the extent to which the existence of the data can be relied upon. This is determined using business rules and verification checks – Completeness – refers to the extent to which the data content must include all of its necessary aspects. – Timeliness – Describes the acceptable latency between data capture, use, transformation, reporting, and sharing – Accessibility- describes how readily the data needs to be made available, to whom and in which locations. – Validity – Describing what constitutes valid data. This will show how data validity is controlled and measured. This shall include a description of the business rules (expressed both as a text-based description, and technically e.g. as a regular expression) that enforce this validity. Data validity may include the range of acceptable values or combination of values across multiple attributes and tables. 	<ul style="list-style-type: none"> ▪ #18325316 - BPS11 Data and Related Technology Governance Principles ▪ #384094 - S062 - Information Management - Data Standards ▪ #18099192 - Asset Data Requirements Framework

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – Integrity – Describing how the integrity between different data sources is maintained both within and across and business functions with a single consistent, 'master' version of corporate data for sharing throughout an organization, and minimised redundancy or disparity. – Consistency: To ensure common and consistent understanding and use <ul style="list-style-type: none"> ▪ Verification and validation of data are minimum characteristics under this standard. ▪ Water Corporation has prepared an Asset Data Requirements Framework to describe the key artefacts that the business needs to define the asset data requirements to enable it to perform its asset management activities. This framework identifies different types of data – static data, dynamic data, event data etc. The framework identifies standards relating to each type of data. At the 2015 Asset Management System Effectiveness Review, we were provided with the business case for the development of these data standards. As the recommendations from this business case have been progressed and implemented, Water Corporation has demonstrated that it is reviewing and improving its asset management system. ▪ Water Corporation applies the data requirements standards through business rules and in-built checks as well as monitoring and review. For example, mobile devices for maintenance delivery are set up with built-in logical inputs, with specific tasks requiring specific mandatory data inputs before the user can move onto the field or close the record in order to minimise incorrect or incomplete data capture. The system also ensures the minimisation of incorrect data being recorded by field staff by utilising drop down options for completing the fields. Free text can also be recorded to provide additional information for some fields. Back-end access to SAP for the drop down options and configuration is limited to specific System Developer staff within the Corporation. ▪ As part of the site visit to the Munster #3 pump station, we saw on a mobile field device the task instruction for a planned maintenance activity being undertaken that day. We were not able to observe the data entry for the completed work order at that time. ▪ We queried Water Corporation regarding the validation and verification undertaken of work order data collected in the field. Water Corporation advised that reviews are undertaken and a 'top ten' dashboard of work order data quality concerns is maintained. These quality issues are raised across business groups in an effort to continually improve. We reviewed the dashboard and note that the quality measures tested include: <ul style="list-style-type: none"> – Correct functional location identified – Location of work identified – Work orders with cost <\$100 – Up and downstream access chamber IDs identified <p>The reporting identified that the most measures were tracking below 95% and some measures had persisted around 50% for a number of years. We queried Water Corporation as to why these data quality issues had persisted despite monitoring and attempts to improve. Water Corporation suggested that a combination of factors were at work including the configuration of the mobile field application and staff training. Water Corporation stated that it currently working</p>	

Effectiveness Criteria	Observations	Evidence reviewed
	<p>on a refresh of its mobile field capture approach which includes user centred design to improve usability.</p> <p>Recommendation R2/2018</p> <ul style="list-style-type: none"> We recommend that Water Corporation be required to report annually on the progress of its nominated actions to address the observed shortcomings: <ol style="list-style-type: none"> Engineer out drivers of errors Provide real time validation on entry Refine the data integrity monitoring. 	
<ul style="list-style-type: none"> Logical security access controls appear adequate, such as passwords 	<p>Summary</p> <ul style="list-style-type: none"> We consider that based on the policy, standard and audit report evidence that Water Corporation has in place logical and adequate access controls to its information systems. <p>Overview of Water Corporation's Security Access Controls</p> <ul style="list-style-type: none"> Board Position Statement BPS11 for Data and Related Technology Governance Principles sets out the principles that govern Water Corporation's data and related technology assets. The Statement includes the following principles relating to information system security: <ul style="list-style-type: none"> [we will] actively manage Data and related technologies risk; [we will] ensure that the Corporation's technology is protected against unauthorised access [we will] ensure that the Corporation's data is protected against disclosure to unauthorised users(confidentiality), improper modification (integrity) and non-access when required (availability) Water Corporation's Information Governance Policy establishes an information governance framework for the business. This policy includes Principle 1.6 for information and access security that "all information will be appropriately secured. Access to information will be managed and restricted as required based on clearly defined security and classification standards". Water Corporation has now published standard S507 Information System Security – Users Account and Systems Management. This standard has been created since the 2015 Asset Management System Effectiveness Review. This standard specifies requirements for user identification, user authentication, user access control, password management and systems management. The Standard includes 30 specific requirements relating to user account management. Examples of these requirements include: 	<ul style="list-style-type: none"> #18325316 - BPS11 Data and Related Technology Governance Principles #556032 - PCY237 - Information Governance #16024261 - S507 Information Systems Security - Users Account and Systems Management #400843 - S069 - Information Access and Protection KPMG OAG Report Extract - Audit Finding 10 - Alignment of Windows Active Directory, SAP, and Grange password parameters to Water CorporationPolicy - Part 1.PNG KPMG OAG Report Extract - Audit Finding 10 - Alignment of Windows Active Directory, SAP, and Grange password parameters to Water CorporationPolicy - Part 2.PNG

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – ASM101 - A common security software technology (Microsoft Active Directory) shall be used to control access to all corporate applications and IT infrastructure. The system must be able to enforce the following in line with this standard: – ASM102 - All user access management function (creation, privilege assignment, disabling and deletion) will be managed centrally by a security function. – ASM104- All users and nonuser (service) accounts must have a unique ID and individual passwords. The user ID must conform to the standard defined by the Manager Business and Technology Solutions (on behalf of the corporation – ASM108 - Selected passwords for user accounts must have a minimum length of eight characters and must satisfy specific requirements: – ASM115 - Assignment of privileges to individuals must be role based (job classification and function). These Privileges must be assigned on a least-privilege basis. ▪ Operationally, Water Corporation use Microsoft Active Director to control access to all corporate applications and to implement the requirements of this standard. ▪ Implementation of this standard was audited by KPMG for the period ending 30 June 2018. An extract of this report was provided to us which identified two minor recommendations relating to implementation of the standard. 	
<ul style="list-style-type: none"> ▪ Physical security access controls appear adequate 	<p>Summary</p> <ul style="list-style-type: none"> ▪ Based on the evidence provided to us and the interviews with key staff, we consider that Water Corporation's physical security access controls are adequate. <p>Overview of Water Corporation's Physical Security Controls</p> <ul style="list-style-type: none"> ▪ All Water Corporation staff are issued with a swipe card which has basic access to the general doors at office and operational locations. ▪ Secure areas such as server rooms need appropriate manager approval for staff to be granted access. Access is then managed through a pin and swipe card system. ▪ We observed during our site visit to the Munster #3 pump station that physical access to the site was restricted by a gate at the entrance and swipe card access to the building and the server room. ▪ Water Corporation also has in place additional controls for high risk assets. For example, access to server racks is controlled by giving technicians access only to the rack that they are working on. ▪ Access at the head office in Leederville is controlled by barrier doors which require swipe card access. There is also a reception desk in place with physical oversight of the entrance doors. 	<ul style="list-style-type: none"> ▪ Site work at the Leederville head office and site visit to the Munster #3 pump station
<ul style="list-style-type: none"> ▪ Data backup procedures appear adequate 	<p>Summary</p>	<ul style="list-style-type: none"> ▪ #19802264 - S212 - Records Management ▪ #20175775 - Extract of Backup requirements including testing in the


Effectiveness Criteria	Observations	Evidence reviewed
and backups are tested	<ul style="list-style-type: none"> Based on the standard in place, reflected in the service provider contract and demonstrated in performance metrics, we consider that Water Corporation has adequate procedures for data backup in place and that the backups are tested. <p>Overview of Water Corporation's Data Backup Procedures</p> <ul style="list-style-type: none"> Water Corporation's standard for Records Management sets out requirements for backup of information stored in corporate systems. The standard sets the following business rules for the backup of corporate system: <ul style="list-style-type: none"> Backups will be completed daily and retained for 7 Days. Backups will be completed weekly and retained for 4 Weeks Backups will be completed monthly and retained for 6 months The standard sets the following business rules for the backup of internal and external websites: <ul style="list-style-type: none"> Daily and retained for 1 month. Monthly and retained for 6 months Backups are undertaken and stored by an off-site service provider, Kinetic. Kinetic operates under a contract with Water Corporation, which includes agreed service levels relating to backups. The two service levels are as follows: <ul style="list-style-type: none"> CSL 9 - IT Service Continuity Test Success which aims to ensure that the Service Provider has the ability to develop, document and test Disaster Recovery capability including loss of Sites, restoration of files, applications data, data bases and other user data. This is performed on a monthly basis and a pass for this service level validates the procedures works. CSL 18 – File Restore which is a measurement of the ability to successfully restore files from backups, as may be required by the Water Corporation. This is performed on an on-demand basis and a pass for this service level validates that the procedures works. There is also a service level for timeliness of back up but this does not reflect the veracity of the backup. We requested and were provided with performance statistics for June 2018 and November 2017. The service levels relating to success of back up were met but in one instance the timeliness of back up was not met. Despite the service provider not meeting the timeliness criterion, we concluded that the requirement of this criterion – that “data backup procedures appear adequate and backups are tested” is being met as this relates to effectiveness. 	<p>Information Support Services Contract (with Kinetic IT)</p> <ul style="list-style-type: none"> Review of Kinetic contract performance metrics for November 2017 and June 2018 at review meeting
<ul style="list-style-type: none"> Key computations related to licensee performance 	<p>Summary</p> <ul style="list-style-type: none"> Based on our review of Water Corporation's policy, standard, reporting system and the additional assurance provided through various independent audits, we consider that key computations related to licensee performance reporting in the review period are materially accurate. 	<ul style="list-style-type: none"> Examples of Business Performance Reports #556032 - PCY237 - Information Governance

Effectiveness Criteria	Observations	Evidence reviewed
reporting are materially accurate	<p>Overview of the Accuracy of Water Corporation's Key Computations</p> <ul style="list-style-type: none"> Water Corporation's Information Governance Policy establishes an information governance framework for the business. This policy includes principle 1.4 for data lifecycle management that "information is complete, accurate and usable by those with a legitimate need". Water Corporation's Information Management Data standard is intended to provide a framework for corporate information management and to direct business users and other stakeholders in the application of data management controls across the information lifecycle. Data quality is within the scope of this standard and the standard notes that data quality is underpinned by a process approach, continuous improvement and the involvement of people. The Business Reporting System is used by Water Corporation to collate, monitor and comment on performance data including licence reporting data. This system includes the following features that help ensure the accuracy of reported data: <ul style="list-style-type: none"> The system accesses and is able to report on trend data so that long term trends and variations are observable Where performance varies unfavourably from targets, the system is able to provide flags to make this apparent The system has the ability for responsible staff to input commentary to explain variances The system allows for reporting at different management levels The system is used as the point of truth for management reporting. Key Performance Indicators are reviewed monthly and the long-term trending data that Water Corporation has available ensures that any examples of outlying performance can be quickly reviewed and confirmed or corrected if found to be erroneous. Licence performance data is audited as part of the Operational Audit. Performance data closely related to the licence performance data is also subject to audit through the National Performance Reporting Framework every three years. Some performance data is also subject to the annual financial audits. 	<ul style="list-style-type: none"> #384094 - S062 - Information Management - Data Standards
<ul style="list-style-type: none"> Management reports appear adequate for the licensee to monitor licence obligations 	<ul style="list-style-type: none"> Water Corporation reports against its operating licence obligations through its Business Performance Reporting system. We have reviewed and made comment on this system and the reports generated throughout this report. We confirm that the reports reviewed are adequate for reporting against key performance indicators and other licence obligations. 	<ul style="list-style-type: none"> Live demonstration of the Business Performance Reporting system and examples of output reports

5.8 Risk management

Table 5-8 Asset Management System Review Observations for Risk Management

Effectiveness Criteria	Observations	Evidence reviewed
<ul style="list-style-type: none"> ▪ Risk management 	<p>Summary</p> <ul style="list-style-type: none"> ▪ We consider that Water Corporation has in place effective policies and procedures for management of risks across its business. It manages risks at different levels which are complementary and enables it to provide a detailed picture of its risk profile. The Corporate Risk Report is a summary of all corporate risks and is used to communicate the risks to the Board. Water Corporation has matured its approach to risk management since the 2016 Asset Management System Review particularly by providing clearer definition for operational risk management. <p>Overview of Water Corporation's Risk management Policies and Procedures</p> <ul style="list-style-type: none"> ▪ Water Corporation seeks to embed risk considerations through its governance structure and processes. This is achieved through an Audit and Risk Committee at Board level and a Risk Management Committee at executive level comprising the entire executive. The terms of reference for the executive risk management committee were provided and reviewed. ▪ The Board Charter sets out that the Board is to provide oversight to ensure risks facing the Corporation are identified, assessed and managed effectively. The Audit and Risk Committee Charter states that this committee is to review the Corporation's Corporate Risk Report to ensure that material business risks are dealt with appropriately. ▪ The Risk Management Policy sets out overall accountabilities and principles for risk management within Water Corporation. At the review meeting we confirmed that this was available on the intranet to all staff. The intranet version was last updated 12 July 2018. The Policy identifies the following objectives for risk management: <ul style="list-style-type: none"> – That risk management forms an integral part of all decision making to ensure risk management is adopted throughout the Corporation as a prudent management practice – To ensure that all employees, contractors and partners are made aware of the need to manage risk, and to promote a culture of participation in the process – To set the standard for the risk management process and subsequently the management of risk ▪ The Policy also establishes a Corporate Risk Management Framework through which risks are identified, assessed and treated consistently across the business in accordance with ISO31000. This is documented in the Corporate Risk Management Guidelines. We reviewed this document at the review meeting and confirmed that the guideline and associated material is available to all staff through the intranet. ▪ Within the Corporate Risk Management Framework, the following model for risk governance reporting and risk based decision making is provided. This shows ultimate responsibility resting with the Board through the audit and risk Board committee and the aggregation of operational risks into business risks and corporate risks. 	<ul style="list-style-type: none"> ▪ #699610 - PCY135 Risk Management Policy ▪ #16100952 - Corporate Risk Management Framework ▪ Asset Risk Framework (#15272031) (version date 26 April 2018) ▪ S389 Corporate Risk Assessment Criteria (#621047) (version date 24 August 2018) ▪ Live demonstration of the Corporate Risk Information System ▪ Corporate Risk Management Guidelines (#625204) (version date August 2018) ▪ #2675129 - SRA - User Manual ▪ #6959471 - Barrier Risk Assessment Manual (Water Quality) ▪ #12120280 - Corporate Risk Information System - QRS-001 System Overview" ▪ #12303923 - Long Term Risk Report (Water Quality) ▪ #15272031 - Asset Risk Framework"

Effectiveness Criteria	Observations	Evidence reviewed
	 <ul style="list-style-type: none"> ▪ The Risk Management Policy also details the following principles for risk management: <ul style="list-style-type: none"> – Corporate and business risk profiles are reviewed annually (desktop or workshop). – Under the Accountabilities Framework, Process Owners in conjunction with Process Managers have full accountability and authority to manage a risk in relation to their process. Risk raised outside of a manager's accountability will be considered and allocated to the applicable areas in accordance with accountability principles. – All risk assessments (process, business or project) within the Corporation will be assessed using the Corporate Risk Assessment Criteria and will be recorded in the Corporate Risk Information System or a formally recognised risk register. – Risk assessments are carried out within a context of the type of risks being identified and the associated objectives. – Identification of controls to manage risk and the effectiveness rating of those controls form a baseline for the assessment of residual risk ratings. Clarity around a control rating of 'operating as intended' should be clearly articulated by the control owner. ▪ Water Corporation has now introduced risk tolerance in its asset risk management approach in line with the objectives in the asset management strategy. The tolerance is expressed as the willingness to achieve (or compromise) corporate outcomes, for example meeting water quality standards. The risk tolerance is documented in the Asset Management Strategy. Risk tolerance is used prioritise expenditure. ▪ Based on the above principles and the accompanying Risk Management Framework, Water Corporation has in place a consistent approach to risk management. Since the 2015 Asset Management System Effectiveness Review, Water Corporation has sought to strengthen the line of sight of risk management from bottom-up operational risks to risks documented at the corporate level. It has done this by maintaining its Corporate Risk Information System (CRIS) for corporate level risk management and reporting while providing more direction around operational risk management and in particular that all risks within the Corporation are to be recorded in 	<ul style="list-style-type: none"> ▪ #16368417 - Status of Planning (Regional) Process ▪ #16898644 - Critical Assets Assessment Procedure ▪ #17031957 - Asset Risk Fundamentals Course.pptx ▪ #17177891 - Corporate Risk Summaries ▪ #17220896 - Asset Risk Principles Course (12 modules).pptx ▪ #18121591 - Asset Deficiency Register Quick Reference Sheet ▪ #18211508 - Corporate Risk Report 2017 ▪ #19332140 - Asset Risk Refresher Training.ppt ▪ #20253339 - Extract of Dam Safety Risk Register ▪ #621047 - S389 Risk Assessment Criteria

Effectiveness Criteria	Observations	Evidence reviewed
	<p>CRIS or a formally recognised risk register, e.g. the drinking water quality risk register arising from barrier risk assessments. This definition of “formally recognised risk registers” is intended to prevent risks being managed outside of the corporate process or stored off-line and not visible to the business. This represents a maturing of Water Corporation’s approach to risk management.</p> <p>Corporate and business risks</p> <ul style="list-style-type: none"> Business risks are recorded in the Corporate Risk Information System. This is the primary repository for corporate, business and project risks. The system is supported by an accountability framework for risk management. Water Corporation’s Accountability Framework under the manage risk process specifies that each business manager is accountable for identifying and managing risks and opportunities from the external and internal environment, related to the relevant business objectives. Around 480 business risks are recorded in the Corporate Risk Information System. We inspected the system at the review meetings and confirmed that it includes fundamental risk management elements such as likelihood and consequence of the risk event, risk owners and the controls in place. The system also includes more mature elements such as an assessment of whether the controls in place are operating satisfactorily and whether management has endorsed the controls in place for the risks. The assessment of the operation of the control uses a three point scale: O (operating as intended), A (attention required) and I (inadequate). The System also tracks actions relating to managing risks (e.g. improving controls) and tracks reviews and updates to the risk assessments. The business risks within the Corporate Risk Information System are mapped to corporate level risks. A Corporate Risk Report is produced quarterly based on the information in the System. We were provided with and reviewed the 2017 Corporate Risk Report. This identifies 19 corporate risks. The number of corporate risks may fluctuate from time-to-time based on the assessed materiality of risks at the corporate level. Water Corporation develops this report based on the information in the System as a starting point but it is then subject to review and integrity checks across the business. This is primarily undertaken through stakeholder workshops led by the Risk and Assurance Business Unit. The Corporate Risk Report includes a Risk, Control, Action Ownership Matrix. This matrix identifies the Business Units within Water Corporation that have the following responsibilities for each of the corporate risks: <ul style="list-style-type: none"> O – Risk owner R – Risk coordinator C = Control owner A – Action owner At the review meeting, we also reviewed the September 2018 Corporate Risk Report as this provides the most current understanding of corporate risk for the review period which is up to the end of June 2018. This report includes commentary on each of the corporate risks and identifies issues important to each of the risks. We saw that the risk for supply chain risk was updated in the 2018 report compared to the 2017 report provided to us due to issues with carbon dioxide supply. This demonstrates that Water Corporation is actively assessing its risks. <p>Operational risks</p>	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> ▪ The Corporate Risk Management Framework identifies that various risk frameworks are further specified and used in the business to operationalise specific business activities and risk management needs. The Corporate Risk Management Framework states that these supporting frameworks are to be compliant with the Corporate Framework. ▪ The following operational risk frameworks are identified but the Corporate Risk Framework notes that this listing, while covering the major frameworks, is not exhaustive as the business may use some minor frameworks and not to preclude the addition of other frameworks in the future: <ul style="list-style-type: none"> – Assets: Asset risk framework, ISO15001 – Water quality: Australian Drinking Water Guidelines – Dams: Australian National Committee on Large Dams – Finance: Accounting Standards – Health and Safety: ISO14001, AS4801, OHSAS18001 – Bushfire: Department of Fire and Emergency Services risk prioritisation ▪ An Asset Risk Framework has been developed as part of the implementation of Water Corporation's ISO55001:2014 aligned asset management system. This replaces the previous approach to asset level risk assessment but retains much of the previously employed approach to asset level risk assessment, particularly the System Risk Assessment approach. ▪ This Framework identifies that asset risk assessment is to be applied at two levels: <ul style="list-style-type: none"> – Service chain portfolio – aggregation of risks for corporate level management, e.g. for all regional water sources – Individual scheme/ service chain element / facility/ process / unit / component – lower level risk assessment ▪ The Framework also identifies responsibilities for the asset owner and asset manager functions across the risk assessment process and also identifies how the Corporate Risk Assessment Criteria may be enhanced for the purposes of asset risk assessment. ▪ The System Risk Assessment (SRA) tool is the primary register for asset risks at a scheme or system level. This is a web based tool that is applied to all of Water Corporation's ~1050 systems – ~550 regulated water supply systems, ~480 sewerage systems, irrigation systems and drainage systems. This system was in place for the 2015 Asset Management System Effectiveness Review, but more work has been done on maturing the system since. One improvement is that the system now includes workflow for reviewing and validating risk assessments ▪ To streamline the process and help achieve consistent outcomes within the System Risk Assessment, Water Corporation has pre-defined risk events depending on the system type. For example, there are 11 pre-defined risk events for regulated water supply including "Supply of water with unacceptable aesthetics" and "The system is unable to maintain continuity of supply". The guidance material notes that not every risk event must be scored and events with a low risk may only have a desktop assessment completed. The intent is to be able to identify the highest risks across the business and be able to compare them on a consistent basis. To enable this, each system risk is given a risk score based on the corporate risk framework. 	

Effectiveness Criteria	Observations	Evidence reviewed
	Training <ul style="list-style-type: none"> Water Corporation has an Asset Risk Fundamentals training course that is intended to help staff to gain an awareness of why risk is important, what the risk management process looks like in our business and how to perform a basic risk assessment The Asset Risk Principles course compliments this, going deeper into advanced risk assessments, specific risk tools as well as risk treatment and risk culture. An Asset Risk Refresher training course is also available. It is essentially an 'Introduction to Asset Risk Management'. This course introduces the Asset Risk Framework and procedures for conducting and applying risk assessments to key decision making activities within Asset Planning. 	
<ul style="list-style-type: none"> Risks are documented in a risk register and treatment plans are actioned and monitored 	Summary <ul style="list-style-type: none"> Based on the evidence provided, we consider that there are risk registers in place for Water Corporation's risks. Business and corporate risks are stored in the Corporate Risk Information System. Operational risk registers include those for water quality and dam safety. An important operational risk register is the System Risk Assessment which documents asset risks for each of Water Corporation's systems. We confirmed that these risk registers include treatment plans ranging from monitoring to operational projects and capital projects. We confirmed that Water Corporation tracks implementation of these plans. Overview of Water Corporation's Risk Registers <ul style="list-style-type: none"> As noted, The Corporate Risk Information System is the primary repository for corporate, business and project risks and therefore acts as the risk register where risks are documented. Around 480 business risks are recorded in the Corporate Risk Information System. We inspected the system at the review meetings and confirmed that it includes fundamental risk management elements such as likelihood and consequence of the risk event, risk owners and the controls in place. The system also includes more mature elements such as an assessment of whether the controls in place are operating satisfactorily and whether management has endorsed the controls in place for the risks. The assessment of the operation of the control uses a three point scale: O (operating as intended), A (attention required) and I (inadequate). The Corporate Risk Information System also tracks actions relating to managing risks (e.g. improving controls) and tracks reviews and updates to the risk assessments. This is for all the business risks included within it. We inspected a number of these business risks at the review meeting and confirmed that treatment plans are in place and that the system includes information for monitoring the implementation of these treatment plans. For the risks that are aggregated to the corporate level, the Corporate Risk Report acts as a summary of the Water Corporation's overall risk profile but also contains detailed documentation of each risk. The documentation includes existing controls as well as further mitigating actions that are being pursued. For each mitigating action an owner and timing for delivery are identified. In this way, the major corporate risks are tracked and actions monitored. At the operational level, we were provided an example of the long term plan for managing water quality risk. This is documented in the Long Term Risk Report for Water Quality. This report provides visibility of all long term changes in drinking water quality risk in terms of challenge or barrier rating and the resultant change in residual risk (from quarter to quarter). 	<ul style="list-style-type: none"> Corporate Risk Information System - QRS-001 System Overview (#12120280) Live demonstration of the Corporate Risk Information System Live demonstration of the System Risk Assessment system Corporate Risk Summaries (#17177891) SRA Risk Register and Barrier Risk Register (Water Quality) to be demonstrated during review. Corporate Risk Report 2017 (#18211508) Extract of Dam Safety Risk Register (#20253339) Long Term Risk Report (Water Quality) (#12303923) Asset Deficiency Register Quick Reference Sheet (Doc 18121591)

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> At the operational level, we also reviewed the System Risk Assessment tool. We first looked at the Goldfields Agricultural Region and saw that the highest risk (rated moderate) for this region is associated with failure of the GAWS Main Conduit Zone 1. We saw the comments describing the risk and the associated treatment which is an asset renewal project. We also reviewed the System Risk Assessment for the Munster Pump Station which is within the metropolitan wastewater region. For the Munster #3 pump station we saw that the highest risk recorded in the system is for overflows from the pump stations. These are contained within an overflow storage but lead to complaints from surrounding residents due to odour. The overflow storage is located at the former pump station site which is now not used, except for the purpose of containing overflow. We saw that there is a project (project number C-S01636) associated with mitigating risk that provides a short description on need, scope, risks and constraints and likely costs. Total costs are estimated at \$26 million but the project is only included in long term forecasts past 2028. The timing of the project is based on demand forecasts which then result into a projection of when the forecast risk becomes unacceptable. There is also a project (project number C-S01628) for upgrade of the Munster Main PS. This is currently scheduled for 2022. We reviewed the index of water and wastewater demand forecasts from which we drilled down to the metropolitan wastewater treatment forecasts. We reviewed the trend for the Woodman Point wastewater treatment plants (which the Munster pump station is immediately downstream of) to identify the forecast related to the expected trigger of 2022 for the upgrade of the main pump station. We consider that the profile of the forecast is reasonable. We also saw demonstrated the System Capability Forecasting tool which brings together various data sets including SCADA trends. We observed trends for the Munster #3 pump station including running hours and flowrate. As the pump station is controlled by a variable speed drive, the hours run trend is fairly consistent. Water Corporation also has in place an Asset Deficiency Register, which captures asset risks identified by staff across the business. These are recorded at asset functional location level, which maps to the SAP finance system. Deficiencies are recorded on a standard spreadsheet across the regions and progressed through a strategy to investment workflow. There are monthly prioritisation meetings, where 6-8 stakeholders review and prioritise all of the new inclusions in the register. The risk associated with the deficiency is assessed and the risk moved through the workflow (or held if within the tolerable level of risk). This is used to inform minor capital works and operational projects. For operational projects, a 1-8 scoring system is used, with risks scored 1-5 receiving funding. Through the operational budgeting process, Water Corporation advised that it was able to better understand and allocate funding to some of the Level 6 risks. 	<ul style="list-style-type: none"> #20355315 - Screenshot of Main Conduit SRA.JPG #17893886 - K2 Consulting – Reliability Analysis for Munster SPS
<ul style="list-style-type: none"> The probability and consequence of risk failure are regularly assessed 	<p>Summary</p> <ul style="list-style-type: none"> We noted in the 2015 Asset Management System Effectiveness Review that a number of risks were identified as being overdue for review and endorsement. The 2015 review also found that the System Risk Assessment processes was still being bedded down within the business. At this review, we have found sufficient evidence to conclude that the probability and consequences of risks are regularly assessed. The evidence provided includes the inspection of risk registers in the Corporate Risk Information System and the System Risk Assessment and the risk review reporting within the Business Reporting System. <p>Overview of Water Corporation's Risk Failure Assessments</p>	<ul style="list-style-type: none"> Live demonstration of the Corporate Risk Information System Live demonstration of the System Risk Assessment system Live demonstration of Business Reporting System including generation of report for System Risk

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> The Risk Management Policy requires that Corporate and process risk profiles are reviewed annually (desktop or workshop). We were provided with the Corporate Risk Reports for 2017 and 2018. We inspected these reports and found that Water Corporation had updated its assessment of the risks (although the assessment remained unchanged for many) and in particular, had updated the commentary associated with its understanding of the operating environment and management of the risks. Within the Corporate Risk Information System, there are workflows for review and endorsement of risk assessments (likelihood, consequence, assessed risk and associated controls). At the review meeting we ran a report to identify risks due for review in the next 90 days. We also ran a report to identify if any risks were overdue for review and found that no risks were overdue for review at that point in time. For the System Risk Assessment, the frequency of review depends on the risk level. High risks must be reviewed annually while moderate risks are to be reviewed every two years and low risks are reviewed as required. Review of System Risk Assessment risks are monitored and reported through the Business Performance Reporting system. The metrics monitored are: <ul style="list-style-type: none"> Review of high risks that have been reviewed in the last 12 months (target - 100%) % of SRA high risks with planned risk mitigation (target - 100%) Number of System Risk Assessment moderate risks that are within 30 days of the due date (target <10) We saw at the review meeting the report on these metrics as at 30 June 2018. This report showed that Water Corporation is achieving 100% compliance for its target of reviewing high/extreme risks each year. The forward looking indicator of the number of moderate risks to review in the next 30 days was above target at 19 compared with the target of 10. Water Corporation explained that this indicator fluctuates from month-to-month; there were 4, 6 and 11 in the three preceding months. At October 2018 the performance was four. This is a forward-looking indicator which demonstrates that Water Corporation is seeking to proactively manage the review process. That the indicator was above target at 30 June 2018 is not an issue given that it is only looking at items upcoming for review and that Water Corporation has demonstrated that it has been able to meet its review targets. 	<ul style="list-style-type: none"> Assessment review metrics as at 30 June 2018 Corporate Risk Report 2017 (#18211508)

5.9 Contingency planning

Table 5-9 Asset Management System Review Observations for Contingency Planning

Effectiveness Criteria	Observations	Evidence reviewed
Contingency Planning		
<ul style="list-style-type: none"> Contingency plans are documented, understood and tested to confirm their operability 	<p>Summary</p> <ul style="list-style-type: none"> Water Corporation has undertaken significant work since the 2015 Review to improve the depth and consistency of its approach to contingency planning. It has substantially revised its approach with a new standard and procedure. It has also embarked on a considerable amount of work to bring its planning up to the new standard. While recognising that Water Corporation has strong procedures now in place, we note that there is further work to do to embed the planning, test plans (only a small 	<ul style="list-style-type: none"> S498 Operational Contingency Planning Standard (#14812496) (version date 4 April 2018) Contingency Planning - development, testing and Review

Effectiveness Criteria	Observations	Evidence reviewed
and to cover higher risks	<p>number of plans have been tested to date) and to refine plans based on the lessons learned from testing. Therefore, we have awarded a performance rating of 2 for this criterion.</p> <p>Operational Contingency Planning Standard</p> <ul style="list-style-type: none"> In response to comments in the 2015 asset management effectiveness review report, Water Corporation reviewed its contingency planning and identified that the coverage, expectations and quality was inconsistent and could be improved. Water Corporation started a working group consisting of representatives from the Operations, Planning and Asset Management groups to look at contingency planning. The work of the group led to the development of the Operational Contingency Planning Standard. The Standard defines the scope of contingency planning in an operational context, regulatory compliance requirements, definitions, how contingency planning relates to other related business processes (such as incident and emergency management) and specifies the key elements and responsibilities in the contingency planning process. It has a framework for assessing where contingency plans are needed and provides a consistent approach to developing the plans. The Standard is supported by other procedures and templates that are referenced in the document. <p>Contingency Planning Procedure</p> <ul style="list-style-type: none"> Water Corporation has also developed an Operational Contingency Plans: Development, Testing and Review procedure (#15108780). This outlines the processes for assessing facilities, undertaking a business impact assessment that identifies critical processes, disruption events and mitigation activities, developing and establishing the plans, ongoing assessments and the allocation of responsibilities. The contingency requirements are reassessed when an asset/facility is upgraded. There is an item included in Water Corporation's Asset Handover Checklist to review, develop and update the Operational Contingency Plans if required. Water Corporation's alliance partners also apply the same processes for contingency planning. The only difference is that the alliance partners may use their own document formats but the information is the same. <p>Development of Contingency Plans</p> <ul style="list-style-type: none"> Water Corporation prepared 74 contingency plans in the first instance, for the higher risk assets that were identified as critical facilities, unique or complex. Standard facilities that did not fit within these categories were also given the opportunity to develop contingency plans if they wanted. The development of the contingency plans was based on the criticality score for the facility. Water Corporation uses a 1 to 5 criticality scoring regime, with 1 being low criticality and 5 being extreme. The highest criticality facilities that were identified and prioritised for the development of contingency plans included Perth Seawater Desalination Plant, Southern Seawater Desalination Plant, Allanooka Borefield and the Carnarvon Borefield. 	<p>Procedure (#15108780) (version date 9 May 2018)</p> <ul style="list-style-type: none"> Listing of Contingency Plans (#20256298) Asset Handover Checklist Template (#606059) Operational Contingency Planning Handover Guideline (#15741826) Operational Contingency Plans for - Water Treatment Plant Denmark - W7001755 (#16295060, Anaconda Dr SPS (#15184901), Mirrabooka Groundwater Treatment Plant – W0005161 (#19100074), Northam WWTP - FL SL012-003 (#17919594) OCP - Exercise and Test program 2017 (#19813039) Sentinel Asset Related Incident listing (#20255025)

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> Workshops were carried out in the regions, with business impact analysis undertaken for each of the facilities identified as needing a contingency plan, to establish the levels of service, failure modes, allowable outages and asset redundancy. The 74 contingency plans that have been developed are now in a review cycle. Technical expertise can be brought in to provide input to the development and review of the plans when required. Water Corporation has implemented an exercise and testing regime for the current contingency plans. There are standard templates for contingency plans for WTPs, WWTPs, WPS, SPS (Sewer Pumping Station and water storage assets). The plans for standard assets are created via drop-down options that automatically return the actions and mitigations depending on the region and asset type selected. <p>Review of Contingency Plans</p> <ul style="list-style-type: none"> During the review of contingency planning, we reviewed the Northam WWTP Operational Contingency Plan and the Denmark WTP Operational Contingency Plan. The Northam WWTP Plan was approved in April 2018 and has a 3 year review cycle, with the next review due in April 2021. The Denmark WTP Plan was approved in February 2017 and is next due for review in 2020. The Northam WWTP was rated with a criticality score of 3. The Denmark WTP was rated with a criticality score of 4. The plans include a summary table at the front that summarises the response and recovery actions to be carried out for each asset within each treatment process stream with the plant. This provides an easy to use checklist for operators to refer to when they need to bring the plant back online. The Plans also include schematics, prevention and preparedness actions to ensure effective deployment of the Operational Contingency Plan at critical times, debrief actions and responsibilities and references to other documents. <p>Testing of Contingency Plans</p> <ul style="list-style-type: none"> Exercising of the Operational Contingency Plans is covered in the Operational Contingency Plans: Development, Testing and Review procedure. This outlines the different formats of exercises that can be used (discussion exercise, function exercise) and the frequency of testing. The procedure sets out the minimum requirements for each exercise type and the testing frequency. Extremely critical assets (rated with a criticality score of 5) are tested at least once a year. Water Corporation also has a program of future tests, and the cost of the testing program for each facility is included in the annual operating budget. Water Corporation has a work instruction for setting up Operational Contingency Plan exercises and a standard template is used to prepare the Exercise Plan that sets out the site information, site objectives and the specific exercise scenario. Water Corporation maintains an Operational Contingency Planning - Exercise and Test Program Register for the contingency plan testing that it has carried out. The spreadsheet register includes the facility name, the failure mode that was tested, the criticality score of the facility, the type of exercise that was completed (functional or desktop), the date of test, links to the relevant Operational Contingency Plan, Exercise Agenda and the Audit Outcome-Actions. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> ▪ The testing exercises are recorded and reported. All exercises are recorded in Sentinel, Water Corporation's hazard and incident system. Any actions resulting from the test are also recorded in the system and are able to be tracked to ensure that they are completed. We reviewed examples of the test report and actions for an exercise at the Allnooka Borefield based on a power failure functional exercise that was carried out in November 2017. ▪ The contingency plan testing is carried out in-house, with assistance provided from the Operational Centre for the management of the exercises. However, Water Corporation is also involved in State level emergency incidents that include the Department of Health and other government organisations to assess response and recovery for major events. Water Corporation's incident and emergency management is aligned to the State Emergency Management Framework. <p><u>Recommendation R3/2018</u></p> <ul style="list-style-type: none"> ▪ In response to recommendation R5/2015, Water Corporation has developed the Operational Contingency Planning Standard and Contingency Planning - development, testing and Review Procedure. These are supported by a template and a Framework for Critical Assets. These actions address the parts of the recommendation to identify the level of application, coverage and contents of contingency plans. ▪ Water Corporation has documented the contingency plans that it has prepared under this revised approach and we reviewed a sample of contingency plans at our review meetings. Water Corporation also provided an exercise and test program for 2018. Only a small number of plans have been tested to date. This recommendation has therefore been left open (and transferred to R2/2018) as consistent implementation is supported by testing and refinement of the plans. ▪ We recommend that Water Corporation continues its program of testing contingency plans so that all Criticality 5 plans are tested by December 2019 and all Criticality 4 plans are tested by June 2020 and that the outcomes of the testing are documented and updates to the plans arising from the lessons learned are actioned. <p>Operational Contingency Plan Training</p> <ul style="list-style-type: none"> ▪ There is an E-learning module to provide staff with an overview of the Operational Contingency Planning, which is provided to all field staff. The module provides information on what contingency planning is, the types of Operational Contingency Plans, why they are important, what staff need to know, how to access the Plans, testing and review processes, what is included in the Plans, the asset handover process, preparation, implementation, and testing of the Plans using mock exercises. ▪ Water Corporation has also used forums and presentations to staff to provide them with information on the contingency planning processes and the Plans that have been developed. ▪ There is a register of all the training that has been provided to staff, and the training is also added to individual staff profiles in the learning management system. ▪ All of the contingency plan exercises can be accessed through the Sentinel system. This allows operators of similar facilities to review all of the contingency plan and testing information and allow them to take the information into account for their own facilities. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Water Corporation operational centre site visit</p> <ul style="list-style-type: none"> Water Corporation has contingency planning for its operational centre. There is a section within Water Corporation's main customer contact centre in Balcatta that can be used as a back-up OC facility if required. All the monitoring and control systems can be accessed from this site. The back-up facility is tested every two years with a short-term temporary move from the main OC to confirm that there are no issues with the systems. This exercise was last completed 18 months ago and so is due to take place again during 2018/19. A room within the OC operates as Water Corporation's incident and emergency room when required. Water Corporation works with other agencies to manage incidents when needed, e.g. Department of Health, Fire Services, Councils, Police, etc. Water Corporation is a member of the Local Emergency Management Committee (LEMC) and the District Emergency Management Committee (DEMC) with other municipal stakeholders. 	

5.10 Financial planning

Table 5-10 Asset Management System Review Observations for Financial Planning

Effectiveness Criteria	Observations	Evidence reviewed
Financial Planning		
<ul style="list-style-type: none"> The financial plan states the financial objectives and strategies and actions to achieve the objectives 	<p>Summary</p> <ul style="list-style-type: none"> Together, Water Corporation's Statement of Corporate Intent and the Strategic Development Plan state the financial objectives and strategies to be achieved over a one year and five year period. The objectives and strategies are reflected in Water Corporation's financial planning tools. Water Corporation has a robust budgeting process to provide alignment between the objectives and day to day financial management. <p>Overview of Water Corporation's Financial Planning</p> <ul style="list-style-type: none"> Water Corporation's approach to financial planning is largely unchanged since 2015. Financial planning is subject to numerous regulatory requirements, including the <i>Corporation Act 2001</i>, <i>AASB Australian Accounting Standards</i> and the <i>Water Corporations Act 1995</i>. The Strategic Development Plan and Statement of Corporate Intent are Water Corporation's two key documents related to its financial planning. The Strategic Development Plan provides a five year outlook and includes information on key emerging issues, financial objectives and operational targets, and an overview of how the Corporation will achieve the objectives and targets. Water Corporation prepares an annual Statement of Corporate Intent (SCI) that represents the agreement between the Water Corporation and the Minister for Water on the Corporation's expected 	<ul style="list-style-type: none"> Live demonstration of Corporate Financial Model at review meeting #410999 - PCY112 Delegated Financial and Legal Authorisations #411000 - S072 Financial and Legal Authorisation Standard #428676 - PCY263 Capitalisation policy #2721044 - Program Management Guideline #9476463 - Macro Budgeting Guidelines 2018-19 #19436344 - Micro Budget Timetable 18-19.xls #19472549 - Micro Planning Guidelines - Key Assumptions & Inputs – Part 1

Effectiveness Criteria	Observations	Evidence reviewed
	<p>level of performance for the financial year. This meets the requirements of the Water Corporations Act 1995.</p> <ul style="list-style-type: none"> ▪ The Annual Report provides a backwards look at the Corporation's financial performance. ▪ Water Corporation's annual financial report is prepared in accordance with AASB Australian Accounting Standards and the Water Corporations Act 1995. The financial report is prepared on the accrual accounting basis and in accordance with the historical cost convention, except for certain financial assets and liabilities which are stated at their fair value. ▪ Water Corporation also develops budget papers for Treasury to help them prepare the overall State budget and the operating subsidies that the Government provides to the Corporation. <p>Interface and Relationship with Government</p> <ul style="list-style-type: none"> ▪ Water Corporation develops its annual Statement of Corporate Intent based on the assumption of adequate surface water storage at the end of the winter in the year. If the storage is below the assumed level, this may have a material impact on the Corporation's ability to supply water as projected and deliver the financial outcomes presented. ▪ In developing the targets and financial outcomes reported to Government in its annual Statement of Corporate Intent, Water Corporation makes assumptions related to Projected Growth, Operating Efficiency, and the CPI Annual Change. The Dividend Payout Rate is also included in the forecasting ▪ The Net Accrual to Government forms the return to the government and represents the Corporation's dividend and tax payments minus its operating subsidy. ▪ The Corporation receives operating subsidies from the WA Government as payment for loss running systems/schemes that that would not otherwise be commercially viable service to provide. 98% of the anticipated dividend is paid out at year end with the remainder paid on completion of the audited financial statements. ▪ The services that are not otherwise commercially viable, and for which Water Corporation is compensated by the Government for the shortfall between customer revenue and the cost of providing the services, can relate to systems/schemes that are impacted by issues of remoteness, diseconomies of scale due to the cost of operating small schemes is much higher per customer than can reasonably be recovered in tariffs, topographical considerations and in some instances, harsh climatic conditions. These factors contribute to the high cost of providing water and wastewater services in the country regions. ▪ As a result, the Corporation is compensated by the Government for the shortfall between customer revenue and the cost of providing the services. ▪ Different rating charges are applied to the systems/schemes depending on the level of the subsidy. The operating subsidies provided by the Government cover: <ul style="list-style-type: none"> – Non-commercial country services – to cover the losses Water Corporation incurs in providing existing services to customers in non-profitable country schemes. As a result of the Government's commitment to providing services at reasonable prices, regulated prices charged in country regions are typically less than the cost of supply. 	<ul style="list-style-type: none"> ▪ #19501336 - Micro Planning Guidelines - Base Load Information - Part 2 ▪ 2018-19 Budget Submission (Operating Budget Pack), Board Meeting, 18 December 2017 ▪ Board Memo - Asset Investment Program 2018-19 - 2022-23 ▪ Extract from GAR Regional Lead Team - Action Tracker – 2017 calendar year ▪ Finance Team for Operations Group - Task Tracker 2017

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – Revenue concessions – to cover concessions to pensioners, seniors and other customers, provided at the request of the Government. – Infill Sewerage Program – to cover the net loss incurred from the development of infill assets in non-commercial areas. ▪ The financial assessments that identify the systems/schemes that require Government operating subsidies are scrutinised by Treasury. There is a robust annual review process of the operating subsidies that assesses the previous year actual operating costs for each scheme to confirm the financial operating loss and quantify the extent of the loss. This then either drives more money to the Government in dividends or more money from the Government for the operating subsidy. It is the responsibility of Water Corporation to operate the systems/schemes to provide the necessary levels of service. ▪ Water Corporation is bound to achieve a five year average 2% efficiency outcome on its operating expenditure by Treasury. In addition, the Corporation has to meet efficiency dividends sought by Government and delivered through operating cost reductions. These efficiency requirements result in the biggest efficiency driver on the Corporation's operating expenditure. ▪ As Water Corporation is owned by the WA Government, any borrowings have an impact on State borrowings and form part of the Government's total debt. As a result, Water Corporation's capital program is sized to minimise the impact on State debt. The Board budget pack for 2018/19 states that a key factor is the State Government's Net Debt Reduction target which requires Water Corporation to deliver total savings of \$128.6 million over the four years to 2020/21. <p>Financial Model</p> <ul style="list-style-type: none"> ▪ Water Corporation's Corporate Financial Model (CFM) picks up all of the organisation's revenue and expenditure items, including opex and capex, borrowing etc., and uses this information to project the return to government resulting from the operating surplus. ▪ We reviewed the current version of the CFM at our review interview. This is the version that aligns with the 2018/19 SDP. ▪ The CFM is used to provide a high level summary of Water Corporation's financial performance and position. The model consists of a series of linked spreadsheets for the period 2006/07 to 2031/32 that cover Balance Sheet, Profit & Loss, Cash Flow Statement and Impact on State Finances. It is used to record the Corporation's financial information related to capex and opex, revenue, tax, debt, balance sheet items, financial indices and growth predictions. ▪ The Strategic Finance Business Unit within the Corporation is responsible for the operations of the CFM, with the source data in the model provided from different business units within the Corporation. The model has very limited edit access, with one point of contact for edit purposes. The model also has limited general access and appropriate security. It has built-in logic checks to ensure that data is correctly flowing through the different worksheets correctly. It has logs that record information uploaded into the model and also record any changes made to the spreadsheets. ▪ The CFM is also used for the Corporation's financial planning, operations and strategy, with the data used for input into the Strategic Development Plan and Statement of Corporate Intent and also for 	

Effectiveness Criteria	Observations	Evidence reviewed
	<p>scenario planning purposes. The Strategic Development Plan forms a five year financial view although the model is able to look out less robustly to a 25 year period.</p> <p>Budget Process</p> <ul style="list-style-type: none"> ▪ A macro budget is prepared by the Financial Management Branch in October every year. This goes through a number of review and approval processes before being presented to the Board for endorsement and then being incorporated into the Strategic Development Plan for submission to the Government. ▪ The CFM processes the Corporation's macro budget to provide: <ul style="list-style-type: none"> – The five year period for the Strategic Development Plan – The one year period for the Statement of Corporate Intent – The four year period for the budget submission of the State Government for inclusion into their overall information management system, allowing them to consolidate the Corporations financial data with other State Government agencies financials. ▪ Water Corporation has a number of budget planning and development guideline documents to assist finance with the preparation of detailed financial plans and to ensure a consistent approach is taken throughout the Business. ▪ The budget guidelines also provide the minimum information requirement to the regions and branches, in order to ensure that plans are in accordance with agreed base budget allocations and New Initiatives/Key Management Priority projects. ▪ The budget guidelines include: <ul style="list-style-type: none"> – Macro Budgeting Guidelines 2018-19 – Micro Budget Timetable 18-19.xls – Micro Planning Guidelines - Key Assumptions & Inputs – Part 1 – Micro Planning Guidelines - Base Load Information - Part 2 ▪ Water Corporation also provided a copy of the Operating Budget Pack for 2018/19 that was provided for a Board meeting on 18 December 2018. The pack includes the financial forecasts that form the basis of the 2018/19 Statement of Corporate Intent and the 2018/19– 2023/24 Strategic Development Plan. <p>Asset Investment Program</p> <ul style="list-style-type: none"> ▪ The asset investment program is the five year forward capital works program. For items on the asset investment program, there should be scoping, planning and delivery business cases that are prepared. The scoping and delivery business case should have a Financial Impact Statement that is used for assessing new capital projects. Operational Impact Business Cases are used to complete business cases for non-asset solutions. 	

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> We reviewed the business case for a renewal of a section of the Great Agricultural Region main at Baandee (CW02504 MC Baandee CH194.5 to 204.4). This included an estimate of operating expenditure, and a memorandum documenting the financial evaluation. We saw the spreadsheet FIS for this project as well. This is a spreadsheet which captures the business area, drivers and business units. Water Corporation utilises a SIBC process to present and provide justification for capital investment projects. SIBCs are prepared for each capital project, to allow the economics of the different engineering options to be assessed. The documents set out the business outcomes that would follow from different levels of investment over a 20-year horizon. <p>Financial Delegation and Authorities</p> <ul style="list-style-type: none"> Water Corporation's financial delegation and authorities are set out in its: <ul style="list-style-type: none"> Delegated Financial and Legal Authorisations Policy Financial Authorisation Standard 	
<ul style="list-style-type: none"> The financial plan identifies the source of funds for capital expenditure and recurrent costs 	<p>Summary</p> <ul style="list-style-type: none"> We confirmed that Water Corporation's financial tools identify the sources of funds for capital expenditure and recurrent costs. The funding sources are reflected in the budget and Asset Investment Program memos provided as evidence. These memos include discussion on assumptions, trends and metrics relating to funding sources. <p>Overview of Water Corporation's Funding Sources</p> <ul style="list-style-type: none"> The Corporate Financial Model (CFM) identifies sources of funds for capital expenditure and recurrent costs based on assumptions made by the finance team. The main sources of income are revenue from customers, subsidies from government and developer contributions. Customer revenue depends on consumption and the tariffs in place. We note in a following effectiveness criterion that Water Corporation is progressing a water conservation program which it has reflected in its revenue forecasts. For an extended period, Water Corporation has had applied a 2% efficiency improvement each year on operating expenditure. Water Corporation has an efficiency model that it uses to assess performance against this 2% operating expenditure requirement. The model indices for the impact of inflation, interest, growth and service level projects. The forecast inputs drive the model to identify what the Corporation can financially afford. The Taxation sheet within the CFM calculates the Corporation's income tax liability to Government, The Borrowings forecast within the CFM provides the level of borrowings required based on the Cash Flow Statement The Net Debt sheet calculates the Corporation's debt and contribution to the overall Sate Net Debt. The Board memo for the 2018/19 Asset Investment Program identifies sources of funding for the five year program to 2022/23. Funding of the investment program is from a combination of new 	<ul style="list-style-type: none"> Water Corporation Financial Corporate Model #9476463 - Macro Budgeting Guidelines 2018-19 2018-19 Budget Submission (Operating Budget Pack), Board Meeting, 18 December 2017 Board Memo - Asset Investment Program 2018-19 - 2022-23

Effectiveness Criteria	Observations	Evidence reviewed
	<p>borrowings and the Corporation's own income. Own income is the major source of funding for capital expenditure. Water Corporation notes that the forecast funding from own income is predicated on forecast revenue and assumed increases in prices. If these forecasts are not achieved, the funding sources may change. The Board memo also includes a projection of the Debt: Total Assets ratio. This is forecast to increase by a minor amount from 34.3 per cent in 2016/17 to 35 per cent in 2022/23.</p>	
<ul style="list-style-type: none"> The financial plan provides projections of operating statements (profit and loss) and statement of financial position (balance sheets) 	<ul style="list-style-type: none"> Summary Based on the documentation reviewed and the evidence provided, we confirm that Water Corporation's financial plan, represented by the CFM, includes projections of operating statements and statement of financial position. <p>Overview of Water Corporation's Financial Projections</p> <ul style="list-style-type: none"> Projections of operating statements (profit and loss) and statement of financial position (balance sheets) are included in Water Corporation's Corporate Financial Model (CFM). As noted previously, the CFM is used to provide a high level summary of Water Corporation's financial performance and position. The model consists of a series of linked spreadsheets for the period 2006/07 to 2031/32 that cover Balance Sheet, Profit & Loss, Cash Flow Statement and Impact on State Finances. It is used to record the Corporation's financial information related to capex and opex, revenue, tax, debt, balance sheet items, financial indices and growth predictions. The financial forecasts included in the CFM roll up into the financial reports and plans developed by the Corporation, e.g. the Strategic Development Plan, Statement of Corporate Intent, overall Business Plan. We also saw these financial projections in the Board budget pack dated December 2017. The Board budget pack outlines financial forecasts that have been included in the Statement of Corporate intent for 2018/19 and for the 2018/19 – 2022/23 Strategic Development Plan. The Board pack notes that the basis for the financial projections are the approved Asset Investment Program and the previously approved financial assumptions. The 2018/18 budget Board pack states that a key factor is the State Government's Net Debt Reduction target which requires Water Corporation to deliver total savings of \$128.6 million over the four years to 2020/21. 	<ul style="list-style-type: none"> 2018-19 Budget Submission (Operating Budget Pack), Board Meeting, 18 December 2017 Board Memo - Asset Investment Program 2018-19 - 2022-23 Live demonstration of Corporate Financial Model at review meeting GAR Regional – Financial Performance – One Pager – as at June 2018 2018-19 Budget Submission (Operating Budget Pack), Board Meeting, 18 December 2017
<ul style="list-style-type: none"> The financial plan provide firm predictions on income for the next five years and reasonable indicative predictions beyond this period 	<p>Summary</p> <ul style="list-style-type: none"> Based on the documentation reviewed and the evidence provided, we confirm that Water Corporation's financial plan, represented by the CFM, includes projections of income. <p>Overview of Water Corporation's Income Projections</p> <ul style="list-style-type: none"> The revenue budget within the CFM is developed by the Strategic Finance Business Unit. The budget includes the projected annual regulated revenue split by Region, line of business (e.g. water, wastewater, drainage, irrigation) and operating type. The budget also takes into account the financial operating subsidies provided by the Government to operate loss making services and cover concessional rebates. The Corporate Business 	<ul style="list-style-type: none"> Live demonstration of Corporate Financial Model at review meeting #20364112 - Cardno Glide Path Request.XLSX

Effectiveness Criteria	Observations	Evidence reviewed
	<p>Development branch is responsible for feeding in the projected revenue from commercial customers. The Development Services Branch is responsible for developing the contributions budget.</p> <ul style="list-style-type: none"> We reviewed the CFM during our review and confirmed that it includes revenue forecasts out to 2031/32. We also confirmed that a log is maintained that shows any changes that have been made to the model, based on changes provided by Treasury as well as any internal changes. We queried Water Corporation as to how it has accounted for the likely impact of reduced consumption as it progresses conservation program which is targeting average annual usage of 115kL per person. Water Corporation advised that it had developed a glide path project of reduced revenue arising from reduced consumption. It provided to us a spreadsheet with this projection which shows that consumption is forecast to reduce from 125kL per person to 121kL per person by 2022/23 with a resulting reduction in revenue from of \$3.7 million in the 2022/23 financial year. The financial forecasts, included in the CFM, including projected income, roll up into the financial reports and plans developed by the Corporation, e.g. the Strategic Development Plan, Statement of Corporate Intent, overall Business Plan. 	
<ul style="list-style-type: none"> The financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services 	<p>Summary</p> <ul style="list-style-type: none"> We confirmed that Water Corporation's financial plan provides for the operations and maintenance, administration and capital expenditure requirements of the services. <p>Overview of Water Corporation's Operating and Capital Financial Planning</p> <ul style="list-style-type: none"> For operating expenditure Activity Based Planning is undertaken. This includes a work breakdown structure for the activity. Work orders for operational, corrective and preventive maintenance are then recorded against the work breakdown structure. This enables tracking of operational costs against operations, maintenance and administration categories. We trailed operating expenditure at our review meetings through Water Corporation's financial models. This included: <ul style="list-style-type: none"> Operating expenditure at a scheme level Operating expenditure aggregated in the CFM Operating expenditure variance tracking The capex budget is formulated from capital requests, that set out the project and the timing of the cash flow required to undertake the project, and a workshop process that determines the projects to be included in the capital expenditure budget for the next year and confirms that the overall budget is within the financial limits set by Treasury. This process is undertaken annually with a five year horizon and expenditure forecast that the Board approves. Water Corporation provided us with its Board Memo for approval of the Asset Investment Program for the five year period 2018/19 to 2022/23. The memo recommends approval of the five year capital budget of \$3,706.9 million. When approved, the capital budget is included in the Water Corporation's Strategic Development Plan, which is subsequently submitted the relevant Minister for inclusion in the State Budget. 	<ul style="list-style-type: none"> Water Corporation Financial Corporate Model Board Memo - Asset Investment Program 2018-19 - 2022-23 Finance Team for Operations Group - Task Tracker 2017 Water Corporation Annual Report 2015/16 Water Corporation Annual Report 2016/17

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> When it is approved, the capital budget is incorporated into the Water Corporation's macro budget and the CFM. We have reviewed and commented on the formulation of asset investment requests under the Asset Acquisition area. 	
<ul style="list-style-type: none"> Significant variances in actual / budget income and expenses are identified and corrective action taken where necessary 	<p>Summary</p> <ul style="list-style-type: none"> We confirmed that Water Corporation identifies and puts in place corrective actions where there are significant variances in income and expenses. This occurs monthly and is a collaborative effort between the central finance team and regional teams that are accountable for budgets. <p>Overview of Water Corporation's Variance Reporting</p> <ul style="list-style-type: none"> The development of the Activity Based Planning operating expenditure referred to under the previous effectiveness criterion include forecast of activities to be undertaken and the frequency of these activities. This allows variances to be tracked in terms of activities, not just expenditure. The Business Performance Reporting portal is used for reporting on variances to budget and recording the reasons for these variances. This information is collected at business unit level and then consolidation for higher level reporting and ultimately for Board reporting. We reviewed the One Page Financial Performance Report for the Goldfields and Agriculture Region for March 2018. We also requested and were provided with the updated One Page Financial Performance Report for June 2018. This report shows year to date tracking against budget for labour, fleet and strategic program activities. There is also detail of the five largest variances in activity based planning tasks. These reports are prepared monthly to inform Regional Lead Team meetings held between regional managers and finance representatives. At these meetings, the reports are reviewed and corrective actions identified. At the review meeting, a report that details the 25 largest variances for operational activities was presented. This report analyses the variance in terms of both volume and unit cost to provide more detailed understanding of the variances observed to inform appropriate corrective actions. Following the previously mentioned monthly meetings, corrective actions are documented and forward forecasts are updated to reflect the latest information. We were provided with the action list for the Goldfields Agricultural Region for 2017. 	<ul style="list-style-type: none"> Live demonstration of Business Performance Reporting system at review meeting Live demonstration of report for largest 25 variances for operational activities GAR Regional – Financial Performance – One Pager – as at June 2018 Live demonstration of spreadsheets and analysis supporting Goldfields and Agricultural Region financial performance report Extract from GAR Regional Lead Team - Action Tracker – 2017 calendar year

5.11 Capital expenditure planning

Table 5-11 Asset Management System Review Observations for Capital Expenditure Planning

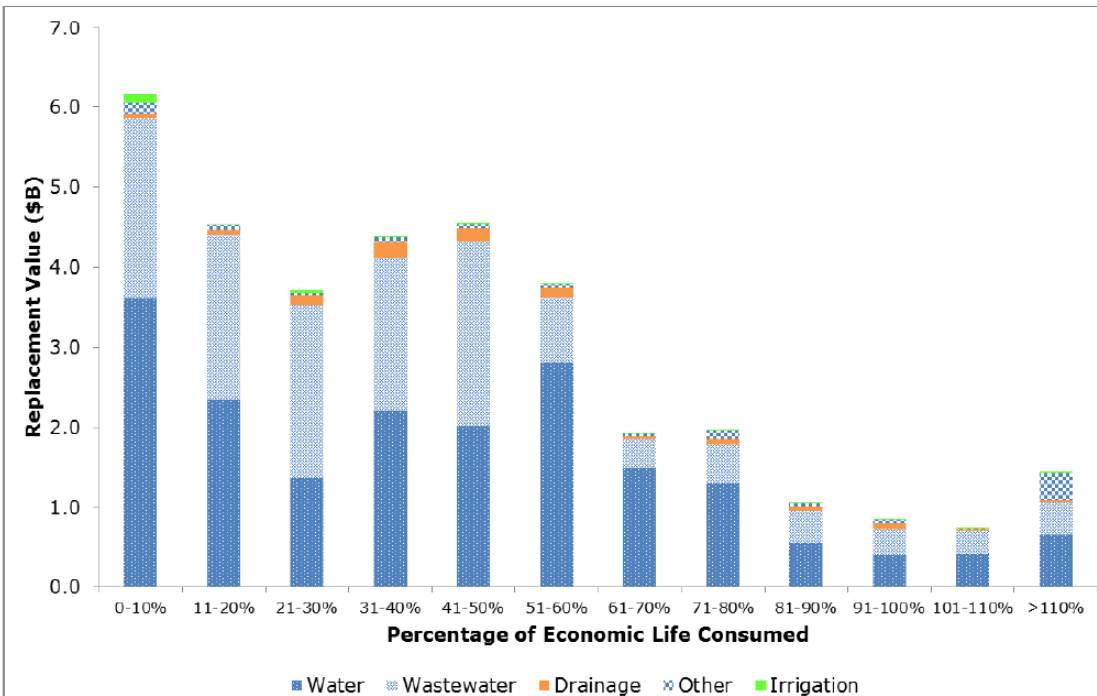
Effectiveness Criteria	Observations	Evidence reviewed
Capital Expenditure Planning		
<ul style="list-style-type: none"> There is a capital 	<p>Summary</p>	<ul style="list-style-type: none"> Water Corporations Act 1995

Effectiveness Criteria	Observations	Evidence reviewed
<p>expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates</p>	<ul style="list-style-type: none"> During the review, we confirmed that Water Corporation has a capital expenditure plan that covers issues to be addressed, actions proposed, responsibilities and dates. The Capital Investment Policy guides the capital investment and the program is formed around the Strategic Investment Business Cases. These are aggregated to form the Asset Investment Program. Accountabilities and responsibilities for the delivery of the capital expenditure program are identified in accordance with the Program Management Guideline <p>Overview of Water Corporation's Capital Expenditure Planning</p> <ul style="list-style-type: none"> The <i>Water Corporations Act 1995</i> requires Water Corporation to prepare a Strategic Development Plan each year. The Plan is required to set out economic and financial objectives and operational targets and how those objectives and targets will be achieved. The Act also requires that the Strategic Development Plan is to include capital expenditure and cover a five year period. Therefore, the capital expenditure forecast included in the Strategic Development Plan each year meets the requirement of this criterion that there is in place a capital expenditure plan. The Strategic Development Plan also identifies issues to be addressed in the form of drivers for expenditure and organisational risks. However, the Strategic Development Plan is also only a summary of the more detailed capital expenditure planning that is undertaken by Water Corporation and is a confidential document to the Corporation and the State Government. Water Corporation has a long-term strategic planning process that considers asset management planning, growth and renewals, taking into account the condition and performance of assets to develop renewals planning programs. When the need for new assets is triggered, the Corporation undertakes its 'Optioneering' process to assess project options and identify whether capital solutions can be deferred as a result of a change in the operating strategy for that particular asset. Details of the planning process are described more fully under the Asset Planning element of this report (Section 5.1). Capital investment is guided by the Capital Investment Policy. This policy includes the following principles for capital investment: <ul style="list-style-type: none"> <i>The need for capital investment across the business is articulated in a series of Strategic Investment Business Cases (SIBCs). Each SIBC contains four investment options that deliver different levels of business outcome. These outcomes directly address customer needs and mitigate the Corporate risks detailed in each SIBC.</i> <i>The Executive Group rate the acceptability of these investment options in terms of the Corporation's strategic objectives. Based on: option acceptability; option cost; level of risk mitigation, and available capital budget, the AIP is developed.</i> <i>The five-year Asset Investment Program (AIP), which is consistent with the requirements of the capital risk mitigations detailed in the Corporate Risk Report, is submitted to Board each November for inclusion in the SDP and submission to Government. In May of each year a detailed year-one AIP and business level budget is approved by the Board.</i> <i>Progress on the delivery of the AIP is reported to the Board in the Business Performance Report, quarterly progress reports and in an annual Board report.</i> 	<ul style="list-style-type: none"> Statement of Corporate Intent 17/18 Water Corporation Strategic Development Plan Strategic Asset Plan 2018-19 (#17930187) Board Memo - Asset Investment Program 2018/19 - 2022/23 #428676 - PCY263 Capitalisation policy #2367933 - Asset Acquisition Guideline #2721044 - Program Management Guideline #6708447 - PCY245 Capital Investment #7093524 - S457 Capital Investment Standard #9431299 - Corporate Budget Planning and Pricing Timetable 2017-18 into 2018-19 including macro budget #12874280 - Water Corporation Business Plan #15320713 - October 2016 Board Paper for Asset Investment Program 2017-18-2021-2022 #16457630 - SIBC Outcomes and Measures - 2017-18 - March 2017 #16884173 - May 2017 Board Paper on the Asset Investment Program 2017-18 #17930187 - Strategic Asset Plan #19525746 - Statement of Corporate Intent 17-18 Board Memo - Asset Investment Program 2018-19 - 2022-23

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – <i>All capital projects must pass approval gateways during the Asset Acquisition Process. The business case and gateway approval requirements are documented in the Asset Acquisition Guideline.</i> ▪ Therefore, this policy sets out that the capital expenditure program is formed around Strategic Investment Business Cases which are aggregated to form the five year Asset Investment Program which is subject to Board review and endorsement each year before submission to the State Government. ▪ There are currently 17 SIBCs in place which cover a mix of asset classes, drivers and geography as follows: <ol style="list-style-type: none"> 1. Metro Water Supply and Demand 2. Regional Water Supply and Demand 3. Drinking Water Quality 4. Metro Water Networks 5. Regional Water Networks 6. Irrigation 7. Metro Drainage 8. Regional Drainage 9. Metro Wastewater Networks 10. Regional Wastewater Networks 11. Metro Wastewater Treatment, Disposal & Re-use 12. Regional Wastewater Treatment, Disposal & Re-use 13. Dam Safety 14. Real Estate Facilities 15. Operational Information and Control 16. Business and Technology Support / FLOWS 17. Retail ▪ Our review examined the SIBC Outcome and Measures report dated March 2017. This report provides line of sight from corporate objectives through desired outcomes and to measures for these outcomes for which targets are specified. The SIBC covers customer objectives, State objectives and outcome measures and targets. The SIBC mapping provides a clear line of sight of the issues that capital expenditure is seeking to address. We have also reviewed and commented on SIBC in the Asset Planning element as well. ▪ The Capital Investment Standard supports the Capital Investment Policy by documenting all the business rules relating to capital. This document sets out the processes and responsibilities for creating and approving capital expenditure budgets, releasing budgets as work is undertaken, change requests and project close out. Capital expenditure budgets are managed in Water Corporation's financial system, SAP. Within SAP, project roles such as project manager and project director are assigned. 	<ul style="list-style-type: none"> ▪ End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - December 2016 ▪ End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - June 2017 ▪ End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - March 2017 ▪ #428675 - S336 Capitalisation Decision

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> The Program Management Guideline documents the processes for delivery of Water Corporation's capital expenditure program with reference to the relevant accountabilities and responsibilities. Therefore, responsibilities for the capital expenditure plan are identified consistent with this guideline. 	
<ul style="list-style-type: none"> The plan provides reasons for capital expenditure and timing of expenditure 	<p>Summary</p> <ul style="list-style-type: none"> We consider that through the SIBC framework and the associated outcomes and measures mapping, Water Corporation has a structure in place for making the link between capital expenditure and its drivers clear. We reviewed capital expenditure relating to drinking water quality in detail and found that the justification for expenditure was clear and linked to appropriate risk assessment processes. <p>Overview of Water Corporation's Capital Expenditure Justification and Timing</p> <ul style="list-style-type: none"> As noted earlier, Water Corporation uses Strategic Investment Business Cases (SIBCs) to justify the projects included in its capital program. Each SIBC drives business outcomes with capital requirements. The SIBCs are completed for each level/type of service (e.g. corporate, water, wastewater, drainage, irrigation) and provide a 20 year view of the issues/drivers, asset risks, available options, project scope, costs, timings, changes in risk profiles and the impact on the business. Executive endorsement of the SIBCs drives the Corporation's capital requirements from the top-down and this is supported by a bottom-up approach from the different Business Units Through the Asset Management System, and as documented in the Asset Strategy, Water Corporation has strengthened this line of sight between corporate objectives and investment undertaken since the 2015 review. We reviewed the Asset Investment Program for 2017/18 including a summary of expected outcomes and expenditure for the period in time. This is a means of tracking the expected benefits of the program. To test the link between capital expenditure, its drivers and timing, we reviewed the SIBC for drinking water quality in particular and noted that this SIBC is to address 141 "extreme" risks. We challenged Water Corporation as to whether this risk assessment was consistent with the corporate risk management approach. Water Corporation responded that these risks are determined through the Barrier Risk Assessment as part of its Drinking Water Quality Management System. Water Corporation provided us with the drinking water risk profile for 2018 arising from the barrier risk assessment. This assessment is for both locations, and multiple characteristics at each location. This results in around 2,300 combinations of location and water quality characteristic which are measured. We reviewed the water quality assessment for the Cunerdin tank project as an example. This capex project resulted in the reduction in the assessed risk for source pathogens and <i>Naegleria Fowleri</i> reducing from extreme to high due to the likelihood being reduced from likely to rare. We challenged whether the 'likely' rating for likelihood was appropriate and if there was any evidence to support this frequency rating being assigned. Water Corporation advised that this is an inferred rating based on expert judgement as it could not always be measured confidently, e.g. separating out background illness within communities. We accept that this approach is appropriate. We trailed this project into the financial system (SAP) and reviewed the major project delivery milestones. Practical completion was reached on 11 June 2018. Expenditure was \$21.5 million against a budget recorded within SAP of \$22.0 million. The budget within the business case was for \$30.656 million. We 	<ul style="list-style-type: none"> PCY263 Capitalisation policy (#428676) (version date 28 Nov 2016) Board Memo - Asset Investment Program 2018/19 - 2022/23 PCY245 Capital Investment (#6708447) (version date 10 Dec 2015) S336 Capitalisation Decision (#428675) (version date 25 May 2018) Statement of Corporate Intent 17/18 Financial Corporate Models Water Corporation Strategic Development Plan Water Corporation Business Plan (#12874280, Revised Plan – based on structure as at 1 September 2015) SIBC Outcomes and Measures - 2017-18 - March 2017 (#16457630) #14751956 – Drinking water quality SIBC

Effectiveness Criteria	Observations	Evidence reviewed
	then reviewed the delivery business case for this project and found that it adequately documents the need to be addressed (water quality) as well as other considerations such as operational improvements.	
<ul style="list-style-type: none"> The capital expenditure plan is consistent with the asset life and condition identified in the asset management plan 	<p>Summary Based on the evidence reviewed, we conclude that capital expenditure is consistent with appropriate triggers for investment including asset condition, risk and age.</p> <p>Overview of Water Corporation's Asset Lives and Renewal Strategies</p> <ul style="list-style-type: none"> Water Corporation uses a number of strategies for end of life asset renewal. Risk based strategies are preferred and condition and aged based strategies are also employed for some asset classes. The Capital Investment Policy sets out that capital expenditure should be justified on a risk basis. This is a more mature approach than relying on asset age. The asset lives used by for planning processes are set out for each asset type in the SIBCs. Asset lives are also included in the Corporation's financial system, where they are used for calculating depreciation. The Strategic Asset Plan includes an aged-based assessment of expenditure for each asset class as shown below. 	<ul style="list-style-type: none"> PCY245 Capital Investment (#6708447) (version date 10 Dec 2015) #17930187 - Strategic Asset Plan #17964096 - Oct 2017 Cervantes Tank EL 3 Investment Decision

Effectiveness Criteria	Observations	Evidence reviewed
	 <p>Figure 10: Age profile of assets</p> <ul style="list-style-type: none"> ▪ This summary is based on detailed age, condition and risk information for each asset category. The information collected by Water Corporation depends on the cost and benefit of collection the information. For example, it is costly to collect condition information for buried water mains. The approach to collection asset condition information for each asset class is documented in the Plan Assets Framework. ▪ We reviewed in detail condition information relating to potable water storage tanks. We reviewed an example condition assessment report for the Cervantes #3 Elevated Tank #3 dated June 2016. This was undertaken by Water Corporation's Mechanical and Electrical Service Branch. We then looked at the investment decision document arising from the condition assessment. This identified a longer term option for a ground level tank with pressure pump from 2026. In the interim, one tank has been replaced based on the observed condition. tank ▪ Within each asset class strategy the lifecycle management approach for that asset class is documented. We reviewed at our review meeting the wastewater network asset class strategy. This strategy shows that for the wastewater network, condition has been inferred from factors including age, material and ground conditions. 	

Effectiveness Criteria	Observations	Evidence reviewed
<ul style="list-style-type: none"> There is an adequate process to ensure that the capital expenditure plan is regularly updated and actioned 	<p>Summary</p> <ul style="list-style-type: none"> We consider that the review processes set out in the capital program documentation, and supporting the requirements in the Capital Investment Policy are adequate to ensure that Water Corporation's capital expenditure plan is regularly updated and actioned. <p>Overview of Water Corporation's Capital Expenditure Review Processes</p> <ul style="list-style-type: none"> Water Corporation has a number of review processes for developing and accessing progress for its capital program. The Capital Investment Policy provides assurance that a <i>'five-year AIP..... is submitted to Board each November for inclusion in the SDP and submission to Government. In May of each year a detailed year-one AIP and business level budget is approved by the Board. Progress on the delivery of the AIP is reported to the Board in the Business Performance Report, quarterly progress reports and in an annual Board report.'</i> The Water Corporation's comprehensive Capital Investment Program and project cost management processes involve regular meetings between Program Managers, Project Directors, Project Managers, Cost Analysts and Estimators and project and program reporting on a daily, weekly, monthly, quarterly and annual basis. A Corporate Budget Planning and Pricing Timetable supports the process for ensuring forecasts, budgets, AIPs are completed and submitted on time for reviews and Board Meeting briefings/approval. We reviewed the 2017/18 to 2018/19 timetable as part of the review. A Governance process is in place to oversee the Corporation's program management. Water Corporation has developed Terms of References for the committees that review, approve and monitor capital projects. Data and reporting tools from project estimates, schedules and cash flow are managed using Primavera and SAP and used to manage projects and program. Water Corporation has a series of reports related to its capital planning activities that it can run from SAP and from the business data warehouse portal: <ul style="list-style-type: none"> Water Corporation is able to report on all of its capital expenditure projects at a project level using the '220' series of reports from SAP. These reports provide the project background, including the needs and scope statements, as well as the expenditure profiles that show forecast against actual expenditure, month-by-month forecast cash flow and milestone dates. Expenditure data and progress is updated by the project managers through the life of the project. The reports are linked with SAP. A '201' report is also able to be generated from SAP to provide the Approved Program Report: Overview. This shows the whole year's capital program and is able to be drilled down to provide much more detailed information and data on specific projects. Additional reports that can be run from SAP include: <ul style="list-style-type: none"> ZR210 – Reports the approved capital program ZR2015 – Reports the five year snapshot of the capital program ZR170 - Reports an overview of project milestones, from Activation to Practical Completion. 	<ul style="list-style-type: none"> PCY245 Capital Investment (#6708447) (version date 10 Dec 2015) Program Management Guideline (#2721044)(version date: 28 January 2015, next review date 31 December 2018) Corporate Budget Planning and Pricing Timetable 2017/18 into 2018/19 including macro budget (#9431299) End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - December 2016 End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - March 2017 End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - June 2017

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – ZR50 – Reports the work breakdown of all the costs and where the costs are being incurred, including actual expenditure and cash flow for a project. ▪ Project information is stored in hard copy for seven years in accordance with the Corporation's audit and document management requirements. ▪ Progress and issues related to capital projects are reported to the Board in the monthly Business Performance report. In addition, the Board is provided with a five year and one year paper for projects in these timeframes. A quarterly report to the Board includes information on major capital projects completed in the quarter and contracts coming up in the forthcoming three month period. ▪ We reviewed three Capital Program Delivery reports– for December 2016, March 2017 and June 2017. These reports detail progress against the annual approved budget month by month and details reasons for observed variances. Expenditure breakdowns by business area are provided along with the share of allocated costs contributed by each business groups. The reports also track project numbers through each gate. 	

5.12 Review of asset management system

Table 5-12 Asset Management System Review Observations for Review of AMS

Effectiveness Criteria	Observations	Evidence reviewed
Review of AMS		
<ul style="list-style-type: none"> A review process is in place to ensure that the asset management plan and the asset management system described therein are kept current 	<p>Summary</p> <ul style="list-style-type: none"> We consider that the review process as documented in the Asset Management System Manual meets the requirement that a review process is in place to keep the asset management plan and the asset management system current. There is sufficient evidence to conclude that Water Corporation implements this review process as described in the Manual (discussed in the next effectiveness criterion). <p>Overview of Water Corporation's AMS Review Processes</p> <ul style="list-style-type: none"> Water Corporation has prepared an "Asset Management System Manual" for its asset management system, the purpose of which is to detail how it undertakes asset management and consolidates all relevant information regarding its asset management system. The Manual details that the development and maintenance of the Asset Management System is the responsibility of the General Manager Assets Planning Group and Head of Asset Strategy. Management review of the asset management system is to consider: <ul style="list-style-type: none"> performance and whether it could be improved whether processes are efficient and achieving desired objectives and outcomes changes in risk profiles the relevance of our asset management objectives. Water Corporation provided to us its Accountabilities Framework which documents these responsibilities for review and maintenance of the system. The Manual identifies the following activities which support review, audit and assurance of the asset management system: <ul style="list-style-type: none"> Corporate risk review External benchmarking under the Water Services Association of Australia (WSAA) asset management benchmarking project every four years Asset management maturity assessments conducted annually (internally or externally) and quarterly Management review of any item requested by process managers on an as needed basis Internal audit of asset management processes and improvement plans as part of the internal audit program Completion of the corporate risk assurance map 	<ul style="list-style-type: none"> #19132591 - Corporate Assurance Map 17-18 #20186938 - Asset Management Strategy #763330 - Accountabilities Framework (20 April 2018 version) #14247282 - Asset Management System Manual #14970739 - MR&A Review and Audit Program 16 -17 #15729220 - BPS09 Infrastructure Asset Management #16800150 - Management of AMSR Procedure #17545151 - AM Maturity Assessment Procedure #17930187 - Strategic Asset Plan #17982389 - Asset Management Maturity Review - 2017 03 Final v1.2 - done by AMCL #20252087 - Listing of documents provided for Review of AMS Asset Management Improvement Action Plan extract from Sentinel (AUD-000251)

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – Signed letter of representation prepared as part of the annual external financial audit process confirming compliance with all internal and external compliance obligations including asset management processes. ▪ The 2015 Asset Management System Effectiveness Review identified that a large number of Water Corporation's documents were out of date, with the review date having passed and no updates being recorded. This issue has not been encountered during this Review. Water Corporation has significantly revised its asset management system, which has resulted in the creation of many new processes. The corporate document management system (Cordocs) has a maximum allowable review period for documents of three years which helps provide some assurance that documents are reviewed as needed. ▪ At the review meeting, Water Corporation's Sentinel system was demonstrated. This system is used for recording and tracking non-compliances and improvement opportunities identified from a range of sources including internal and external audits. We found that all the items arising from the 2015 Asset Management System Effectiveness Review were recorded in this system, along with actions (completed) noted against each (Sentinel reference AUD-00251 AM maturity assessment). This provides further assurance that Water Corporation implements the findings of reviews of the asset management system. 	
<ul style="list-style-type: none"> ▪ Independent reviews (e.g., internal audit) are performed of the asset management system 	<p>Summary</p> <ul style="list-style-type: none"> ▪ As detailed, above, the Asset Management System Manual identifies the activities which support review, audit and assurance of the asset management system. <p>Overview of Independent Review on Water Corporation's AMS during the Review Period</p> <ul style="list-style-type: none"> ▪ We reviewed an external asset management maturity assessment report undertaken on Water Corporation's asset management system. This review was commissioned by Water Corporation but was undertaken by a third party. The external review was undertaken in March 2017 and the report version was dated October 2017. The review was undertaken against the Global Forum on Maintenance and Asset Management's 39 asset management subject areas grouped into six subject areas. The review scored Water Corporation as being between 2.0 and 2,6 in for the six subject areas with a noted target score of 3.0. Water Corporation advised that has recently completed a procedure so that it can undertake future quarterly reviews of the asset management system using internal resources. ▪ Internal audits within Water Corporation are the responsibility of the Risk and Assurance Branch. These audits include audits of asset management processes. Internal audit priorities are identified on a risk basis and a two year audit plan is prepared. ▪ The internal audit program includes audits relevant to asset management such as: <ul style="list-style-type: none"> – Implementation and Monitoring of Risk Mitigation Plans – Manage Drinking Water Quality – Incident management – Effectiveness of planned maintenance 	<ul style="list-style-type: none"> ▪ #763330 - Accountabilities Framework (20 April 2018 version) ▪ #14247282 - Asset Management System Manual ▪ #14970739 - MR&A Review and Audit Program 16 -17 ▪ #17982389 - Asset Management Maturity Review - 2017 03 Final v1.2 - done by AMCL ▪ #17018578 - Final Report – GSR Business Activities ▪ #17514996 - Final Report – Review of Governance Major Contracts – CAPEX Variance Management

Effectiveness Criteria	Observations	Evidence reviewed
	<ul style="list-style-type: none"> – Governance of Major Contracts – CAPEX Variance Management – Corporate Combined Risk and Assurance Map ▪ The various activities described above from asset management maturity assessments, internal audits and external benchmarking provide sufficient evidence that Water Corporation undertakes independent reviews of its asset management system. 	

6 Recommendations

The recommendations arising from this Asset Management System Effectiveness Review are detailed in Table 6-1.

Table 6-1 Table of Current Review Asset System Deficiencies/Recommendations

A. Resolved during current audit period			
Ref.	Asset System Deficiency (Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)	Date Resolved (& management action taken)	Auditor's Comments
B. Unresolved at end of current Audit period			
Reference (no./year)	Asset System Deficiency (Rating / Asset Management System Component & Effectiveness Criteria / Details of Asset System Deficiency)	Auditor's recommendation	Management action taken by end of Audit Period
R1/2018	<p>A1</p> <p><i>Asset planning - Asset management plan covers key requirements</i></p> <p>The Asset Management Strategy includes completing the Asset Class Plans in the section on Continuous Improvement and Review; however, no details of the Asset Class Plans to be developed or the proposed timeframes to complete them is included in the document.</p>	<p>We recommend that Water Corporation modifies the Summary of Improvement Opportunities include in the Asset Management Strategy to include due dates and accountabilities for each of the identified improvements.</p>	
R2/2018	<p>A2</p> <p><i>Asset management information systems - Input controls include appropriate verification and validation of data entered into the system</i></p> <p>Water Corporation's tracking of work order data quality has identified that quality for some measure are persistently not meeting its requirements.</p>	<p>We recommend that Water Corporation be required to report annually on the progress of its nominated actions to address the observed shortcomings:</p> <ol style="list-style-type: none"> 1. Engineer out drivers of errors 2. Provide real time validation on entry 3. Refine the data integrity monitoring 	
R3/2018	<p>A2</p> <p><i>Contingency planning - Contingency plans are documented, understood and tested to confirm their operability and to cover higher risks</i></p> <p>In response to recommendation R5/2015, Water Corporation has developed S498 Operational Contingency Planning Standard and Contingency Planning - development, testing and Review Procedure. These are supported by a template and a Framework for Critical Assets. These actions address the</p>	<p>We recommend that Water Corporation continues its program of testing contingency plans so that all Criticality 5 plans are tested by December 2019 and all Criticality 4 plans are tested by June 2020 and that the outcomes of the testing are documented and updates to the plans arising from the lessons learned are actioned.</p>	

B. Unresolved at end of current Audit period			
	<p>parts of the recommendation to identify the level of application, coverage and contents of contingency plans.</p> <p>Water Corporation has documented the contingency plans that it has prepared under this revised approach and we reviewed a sample of contingency plans at our review meetings. Water Corporation tested a selection of plans in 2017-18. They also provided an exercise and test program for 2018-2024.</p> <p>This recommendation has therefore been left open (and transferred to R2/2018) as consistent implementation is supported by testing and refinement of the plans.</p>		

7 Confirmation of the Asset Management System Review

I confirm that the review carried out at the Water Corporation on Monday 5 November 2018 and Thursday 8 November 2018 and recorded in this report is an accurate presentation of our findings and opinions.

Stephen Walker
Business Leader – Asset Strategies
Cardno (QLD) Pty Ltd
515 St Paul's Terrace
Fortitude Valley QLD 4006

19 February 2019

APPENDIX

A

RISK MANAGEMENT FRAMEWORK

Types of Compliance Risk

Type of Risk	Examples
Supply quality and reliability	Delays in new connections, excessive supply interruptions, supply quality standards not met.
Consumer protection	Customer service levels not met, incorrect bills, disconnection and reconnection standards not met, customers unable to access financial hardship assistance.
Legislation/licence	Breach of industry Acts, regulations and codes, contravention of licence conditions.

Risk Assessment Rating Scales

The consequence, likelihood, inherent risk and adequacy of internal controls are assessed using a 3-point rating scale as described below. The rating scale is as per the Audit and Review Guidelines: Water Licences, (Economic Regulation Authority), April 2014.

Consequence Rating

The consequence rating scale is outlined below.

Rating	Supply Quality and Reliability	Consumer Protection	Breaches of Legislation or Other Licence Conditions
1 Minor	Breaches of supply quality or reliability standards – affecting small number of customers. Delays in providing a small proportion of new connections.	Customer complaints procedures not followed in a few instances. Small percentage of disconnections or reconnections not completed on time. Small percentage of bills not issued on time.	Legislative obligations or licence conditions not fully complied with, minor impact on customers or third parties. Compliance framework generally fit for purpose and operating effectively.
2 Moderate	Supply quality breach events that significantly impact customers; large number of customers affected and/or extended duration and/or damage to customer equipment. Supply interruptions affecting significant proportion of customers on the network for up to one day. Significant number of customers experiencing excessive number of interruptions per annum. Significant percentage of new connections not provided on time/ some customers experiencing extended delays.	Significant percentage of complaints not being correctly handled. Customers not receiving correct advice regarding financial hardship. Significant percentage of bills not issued on time. Ongoing instances of disconnections and reconnections not completed on time, remedial actions not being taken or proving ineffective. Instances of wrongful disconnection.	More widespread breaches of legislative obligations or licence conditions over time. Compliance framework requires improvement to meet minimum standards.
3 Major	Supply interruptions affecting significant proportion of customers on the network for more than one day. Majority of new connections not completed on time/ large number of customers experiencing extended delays.	Significant failure of one or more customer protection processes leading to ongoing breaches of standards. Ongoing instances of wrongful disconnection.	Willful breach of legislative obligation or licence condition. Widespread and/or ongoing breaches of legislative obligations or licence conditions. Compliance framework not fit for purpose, requires significant improvement.

Likelihood Ratings

The likelihood rating scale is described below.

Level	Description
A	Likely
B	Probable
C	Unlikely

Inherent Risk Assessment Rating and Description

The inherent risk rating is based on the combined consequence and likelihood rating. The inherent risk assessment rating scale and descriptions are outlined below.

Likelihood	Consequence		
	Minor	Moderate	Major
Likely	Medium	High	High
Probable	Low	Medium	High
Unlikely	Low	Medium	High

Level	Description
High	Likely to cause major damage, disruption or breach of licence obligations
Medium	Unlikely to cause major damage but may threaten the efficiency and effectiveness of service
Low	Unlikely to occur and consequences are relatively minor

Adequacy Ratings for Existing Controls

The adequacy of existing internal controls is also assessed based on a 3-point scale as indicated below.

Level	Description
Strong	Controls that mitigate the identified risks to an appropriate level
Moderate	Controls that only cover significant risks; improvement required
Weak	Controls are weak or non-existent and have minimal impact on the risks

Assessment of Audit Priority

The assessment of audit priority is used to determine the audit objectives, the nature of audit testing and the extent of audit testing required. It combines the inherent risk and risk control adequacy rating to determine the priority level.

Inherent Risk	Adequacy of Existing Controls		
	Weak	Medium	Strong
High	Audit Priority 1	Audit Priority 2	
Medium	Audit Priority 3	Audit Priority 4	
Low	Audit Priority 5		

APPENDIX

B

AM PERFORMANCE RATING
DEFINITIONS

Asset Management Review Rating Scales

The asset management review utilises a combination of asset management adequacy ratings and asset management performance ratings, which are outlined below. These are based on the Economic Regulation Authority's Audit and Review Guidelines: Water Licences, July 2014.

Asset Management Adequacy Ratings

Rating	Description	Criteria
A	Adequately defined	<ul style="list-style-type: none"> Processes and policies are documented. Processes and policies adequately document the required performance of the assets. Processes and policies are subject to regular reviews, and updated where necessary. The asset management information system(s) are adequate in relation to the assets that are being managed.
B	Requires some improvement	<ul style="list-style-type: none"> Process and policy documentation requires improvement. Processes and policies do not adequately document the required performance of the assets. Reviews of processes and policies are not conducted regularly enough. The asset management information system(s) require minor improvements (taking into consideration the assets that are being managed).
C	Requires significant improvement	<ul style="list-style-type: none"> Process and policy documentation is incomplete or requires significant improvement. Processes and policies do not document the required performance of the assets. Processes and policies are significantly out of date. The asset management information system(s) require significant improvements (taking into consideration the assets that are being managed).
D	Inadequate	<ul style="list-style-type: none"> Processes and policies are not documented. The asset management information system is not fit for purpose (taking into consideration the assets that are being managed).

Asset Management Performance Ratings

Rating	Description	Criteria
1	Performing effectively	<ul style="list-style-type: none"> The performance of the process meets or exceeds the required levels of performance Process effectiveness is regularly assessed and corrective action taken when necessary
2	Opportunity for improvement	<ul style="list-style-type: none"> The performance of the process requires some improvement to meet the required level Process effectiveness reviews are not performed regularly enough Process improvement opportunities are not actioned
3	Corrective action required	<ul style="list-style-type: none"> The performance of the process requires significant improvement to meet the required level Process effectiveness reviews are performed irregularly or not at all Process improvement opportunities are not actioned
4	Serious action required	<ul style="list-style-type: none"> Process is not performed or the performance is so poor that the process is considered to be ineffective

APPENDIX

C

KEY DOCUMENTS AND INFORMATION SOURCES

Asset Planning

- > #18679560-Demand Analysis Increase in Maturity Report
- > #19353443-Operations and Maintenance Planned Activities Business Case 2018-19
- > #19375983-S-CL-CV-2018-Gravity Sewer Asset Class Plan (ACP)
- > #19578084-Manage Asset Deficiency Work Instruction
- > #19581781-Monitor Asset Performance Work Instruction
- > #19581984-Plan Asset Investigations Work Instruction
- > #19747720-Plan Assets Manual
- > #19993477-One Pathway to Investment Guideline
- > #20186938-Asset Management Strategy
- > #20264709-Planning Reports List
- > #20275732-Listing of documents for Asset Planning
- > 2018-19 Budget Submission (Operating Budget Pack), Board Meeting, 18 December 2017
- > Board Memo - Asset Investment Program 2018-19 - 2022-23
- > Planned Operations and Maintenance Prioritisation Process Guideline
- > W-CL-CV-2018-Water Reticulation Asset Class Plan (ACP)
- > #8717283-Manage Asset Condition Guideline
- > #14708067-Water and Wastewater Demand Forecasting Framework
- > #14951303-Index of Water and Wastewater Demand Forecasts
- > #15272031-Asset Risk Framework
- > #15643272-Plan Assets Framework
- > #15763214-Asset Class Strategy Guideline
- > #17385747-Water Reticulation Asset Class Strategy
- > #17930187-Strategic Asset Plan
- > #15023438-Bennett Street Main Drain Capacity Review 2016
- > #15768211-Pinjarra WW Planning - Technical Advice - February 2017
- > #16371902-Collie Allanson Long Term Planning 2016
- > #18640189-Yanchep Water Supply - Short-Medium Term Planning Report - August 2018
- > #19816660-Newdegate TWS - Planning Review - CW02998 Newdegate Tanks and Retic Booster PS

Asset Creation/Acquisition

- > #15499229-BPS09 Infrastructure Asset Management
- > #15643272-Plan Assets Framework
- > #19421595-Procedure – Transfer of Operational Assets from a Third Party
- > #20275889-Listing of documents for 2 - Asset Creation and Acquisition
- > #364850-PCY216 Procurement of Goods and Services Policy
- > #365453-Cost Estimating for Infrastructure Planning
- > #367419-FIS - Guidelines for completing a Financial Impact Statement
- > #367430-S118 Procurement of Goods and Services
- > #367574-S066 Manage Finance – Evaluate Investments
- > #372092-Guidelines for Procurement
- > #457191-Asset Commissioning Guideline

- > #589709-Asset Data Handover Guideline
- > #589718-Defects and Warranty Management Guideline
- > #589719-Licences and Approvals Guideline
- > #589729-Asset Handover Guideline
- > #1074204-Engineering Design Manual
- > #1376931-Project Management Guidelines
- > #2366894-Project Scoping Business Case
- > #2367933-Asset Acquisition Guidelines
- > #2367952-Post Delivery Review Guideline
- > #3350289-Project Delivery Business Case - Major Project
- > #6446243-External Approvals Manual
- > #13067700-FIS - Manual with instructions on how to complete a Financial Impact Statement

Asset Disposal

- > #19581984-Plan Asset Investigations Work Instruction
- > #19666779-Plan & Investigate Asset Renewals Guideline
- > #20246885-Asset Retirements 15-16 to 17-18
- > #20268025-Listing of documents provided for 3 - Asset Disposal
- > #2492016-Decommissioning and Dispose Assets Guideline
- > #19578084-Manage Asset Deficiency Work Instruction
- > #19581781-Monitor Asset Performance Work Instruction

Environmental Analysis

- > #392001-Arrowsmith Water Resource Management Operating Strategy
- > #764114-PCY220 Wastewater Recycling
- > #6245506-Senior Managers Chart
- > #6547166-PCY230 Environment Policy
- > #15570005-Customer Strategy 2016 - 2021
- > #15930055-Busselton WW Disposal Performance Compliance Report (15-16)
- > #17671533-Laverton WWTP Annual Audit Compliance Report 16-17
- > #17930187-Strategic Asset Plan
- > #18100347-Arrowsmith Annual Water Monitoring Summary
- > #18140726-Kemerton WW Disposal Performance Compliance Report 16-17
- > #18439818-PCY327 Wastewater Quality Policy
- > #18632148-Drinking Water Quality Annual Report 2016-17
- > #18795449-Wyndham Water Monitoring Summary
- > #19302455-Example of Environment Scan #2 - June 2018 External Scan for Board Engagement
- > #19328926-Tap In Insights - What our customers told us
- > #19386972-External Scan Guideline
- > #19525746-Statement of Corporate Intent 17-18
- > #19833048-Kojonup WWTP Annual Audit Compliance Report 17-18
- > #19961091-Northam WWTP Annual Environmental Report 17-18
- > #19971527-Jurien WWTP Annual Environmental Report 17-18

- > #20186938-Asset Management Strategy
- > #20230593-Example of Environment Scan #1 - May 2016 Board Strategy Session Pre-Reading
- > #20257132-Listing of Documents provided for 4 - Environmental Analysis
- > ERA Performance Report 2015-16 - Licence Specific Information.
- > ERA Performance Report 2015-16 - Minor Town Data Submission
- > ERA Performance Report 2015-16 - NPR Audit - final report 14 October 2016
- > ERA Performance Report 2015-16 - Water Corporation Performance Report 15-16 Additional Information
- > ERA Performance Report 2016-17 - 2017 Drainage Service Standards Audit Report
- > ERA Performance Report 2016-17 - Licence Specific Datasheet 16-17
- > ERA Performance Report 2016-17 - Minor Town Data 16-17.
- > ERA Performance Report 2016-17 - Ord Irrigation Datasheet 16-17
- > ERA Performance Report 2016-17 - Services Provided by Agreement 16-17 Audit Letter
- > ERA Performance Report 2017-18 - Licence Specific.
- > ERA Performance Report 2017-18 - Minor Towns 17-18
- > ERA Performance Report 2017-18 - Ord Irrigation 17-18
- > ERA Performance Report 2017-18 - Services Provided by Agreement - audit letter
- > ERA Performance Report 2017-18 - Water Corporation Drainage Service Standards Audit Report
- > Water Services Code of Conduct (Customer Service Standards) 2013
- > Water Services Code of Conduct (Customer Service Standards) 2018
- > #178933-PCY066 Water Efficiency
- > #353413-PCY 225 Policy for Customer Complaints Management
- > #364874-PCY272 Drinking Water Source Protection Policy
- > #364875-PCY261 Drinking Water Quality Policy
- > #365213-Wyndham Water Resource Management Operating Strategy

Asset Operations

- > #824419-SAP-QRS-PM-001 Work Management Using ZW05
- > #824434-Quick Reference Sheet - Work instruction for how to create a Functional Location (FL) using SAP
- > #1991393-PCY328 Corporate Training and Organisational Development
- > #2295249-Quick Reference Sheet - Maintaining Functional Locations
- > #2353912-S110 Incident Management
- > #3412729-SAP-QRS-PM-046 Managing PM04 Work Orders in the Planning Table using ZW05a
- > #3955868-PCY340 - Scheme and Asset Operations
- > #6352223-Work Program Formulation Manual
- > #7796020-SCADA Infrastructure Plan
- > #9032486-Regional Operations - Work Planning and Scheduling - Procedure for Planning
- > #9050583-Regional Operations - Work Planning and Scheduling - Procedure for Commitment
- > #9072160-Regional Operations - Work Planning and Scheduling - Procedure for Scheduling
- > #9137516-S471 Corporate Training and Organisational Development Standard
- > #9365458-PCY194 Incident Management
- > #14464012-WebEOC – Quick Reference Sheet

- > #16811652-Execute Scheme Operations - System Change Instruction
- > #17361040-Scheme and Asset Operations Plan Guideline
- > #17943506-AAP_Single Page Risk Prioritisation
- > #18991455-Execute Scheme Operations - guideline
- > #19114692-Execute Scheme Operations - Develop Standard OC Scheme Report
- > #19183829-Asset Registration SAP PM FLER Guideline
- > #20255025-Record of incidents - Sentinel Asset Related Incident listing
- > #20274535-List of Scheme Operating Plans
- > #20291397-Listing for documents provided under Asset Operations
- > Planned Operations and Maintenance Prioritisation Process Guideline
- > #364849-PCY208 - Identification of Engineering Assets
- > #458013-FICO Quick Reference Sheet - Financial Master Data Maintenance - Cost_Profit Centres
- > #506554-SAP Plant Maintenance Ready Reckoner
- > #577852-Settlement of Assets Work Instruction
- > #589709-Asset Data Handover Guideline
- > #824139-FICO Quick Reference Sheet - Financial Master Data Maintenance - Accounts_Cost Elements_CE Groups

Asset Maintenance

- > #19581781-Monitor Asset Performance Work Instruction
- > #19581984-Plan Asset Investigations Work Instruction
- > #19747766-Plan Asset Maintenance Guideline
- > #19993477-One Pathway to Investment Guideline
- > #20014377-AIPR Monthly Reporting - September 2018 example
- > #20278089-Listing of documents for 6 - Asset Maintenance
- > Planned Operations and Maintenance Prioritisation Process Guideline
- > #825046-Maintenance Standard Register
- > #8717283-Manage Asset Condition Guideline
- > #16305707-BPS10 Maintenance
- > #17201988-Asset Maintenance Requirements FMEA-RCM Guideline
- > #19353443-Operations and Maintenance Planned Activities Business Case 2018-19
- > #19578084-Manage Asset Deficiency Work Instruction

Asset Management Information System

- > #16024261-S507 Information Systems Security - Users Account and Systems Management
- > #16033764-S501 Information Systems Security – Security Architecture and Risk Management
- > #16042822-S505 Information Systems Security – Secure Software Development
- > #16074174-S500 Information Systems Security – Acceptable Use
- > #16075708-S502 Information Systems Security - Storage Auditing and Business Continuity
- > #17048673-Facility Rules Information and Guidelines for NEXTDC Data Centres V05
- > #17321863-S513 Privacy
- > #18099192-Asset Data Requirements Framework
- > #18325316-BPS11 Data and Related Technology Governance Principles

- > #18714435-DTG Project Delivery Life Phases and gates
- > #19378250-ClearSCADA 2013 Backup & Recovery Systems.
- > #19671571-Kinetic IT - Work Instruction - HOW TO PROCESS AN IDMAC NEW STARTER REQUEST
- > #19682671-Kinetic IT - Work Instruction - SAP PR4 - Adding Roles to Positions
- > #19802264-S212 - Records Management
- > #20175775-Extract of Backup requirements including testing in the Information Support Services Contract (with Kinetic IT)
- > #20276542-Listing of documents for 7 - Asset Management Information Systems
- > #384094-S062 - Information Management - Data Standards
- > #400843-S069 - Information Access and Protection
- > #400844-S076 Information Systems – Staff Movement
- > #400846-S078 - Standard Office Systems - Document Storage Conventions
- > #556032-PCY237 - Information Governance
- > #3390703-ICT DR Server Infrastructure Recovery Document
- > #4826936-G 40-01 ClearSCADA_Database - How to Manual
- > #9832921-SCADA Security Management Strategy
- > #12841026-Business and Technology Solutions (BATS) - Training Strategy Template Checklist
- > #14013805-PCY252 Privacy
- > #14817589-DTG Project Execution Plan Template
- > #15400730-SCADA Servers Disaster Recovery - Procedure

Risk Management

- > #12120280-Corporate Risk Information System - QRS-001 System Overview
- > #12303923-Long Term Risk Report (Water Quality)
- > #15272031-Asset Risk Framework
- > #16100952-Corporate Risk Management Framework
- > #16368417-Status of Planning (Regional) Process
- > #16898644-Critical Assets Assessment Procedure
- > #17031957-Asset Risk Fundamentals Course
- > #17177891-Corporate Risk Summaries
- > #17220896-Asset Risk Principles Course (12 modules)
- > #18121591-Asset Deficiency Register Quick Reference Sheet
- > #18211508-Corporate Risk Report 2017
- > #19332140-Asset Risk Refresher Training
- > #20253339-Extract of Dam Safety Risk Register
- > #20258143-Listing of Documents for 8 - Risk Management
- > #457125-PCY298 Buried Assets Damage Prevention
- > #621047-S389 Risk Assessment Criteria
- > #625204-Corporate Risk Management Guidelines
- > #699610-PCY135 Risk Management Policy
- > #1138415-PCY315 Business Continuity Management
- > #2675129-SRA - User Manual

- > #6959471-Barrier Risk Assessment Manual (Water Quality)

Contingency Planning

- > #14812496-S498 Operational Contingency Planning Standard
- > #15108780-Contingency Planning - development, Testing and Review Procedure
- > #15184901-PRA - Operational Contingency Plan - Anaconda Dr SPS
- > #15741826-Operational Contingency Planning Handover Guideline
- > #16295060-Operational Contingency Plan - Water Treatment Plant Denmark - W7001755
- > #17919594-Operational Contingency Plan - Northam WWTP - FL SL012-003
- > #18911043-OCP Training - 2018
- > #19100074 -Operational Contingency Plan - Mirrabooka Groundwater Treatment Plant – W0005161
- > #19813039-OCP - Exercise and Test program 2017
- > #20203637-OCP - E learning module
- > #20255025-Sentinel Asset Related Incident listing
- > #20256298-Listing of Contingency Plans
- > #20272970-Listing of documents for 9 - Contingency Planning
- > #606059-Asset Handover Checklist Template

Financial Planning

- > #20268183-Listing of documents provided for 10 - Financial Planning
- > 2018-19 Budget Submission (Operating Budget Pack), Board Meeting, 18 December 2017
- > Board Memo - Asset Investment Program 2018-19 - 2022-23
- > #410999-PCY112 Delegated Financial and Legal Authorisations
- > #411000-S072 Financial and Legal Authorisation Standard
- > #428676-PCY263 Capitalisation policy
- > #2721044-Program Management Guideline
- > #9476463-Macro Budgeting Guidelines 2018-19
- > #19436344-Micro Budget Timetable 18-19
- > #19472549-Micro Planning Guidelines - Key Assumptions & Inputs – Part 1
- > #19501336-Micro Planning Guidelines - Base Load Information - Part 2

Capital Expenditure Planning

- > #12874280-Water Corporation Business Plan
- > #16457630-SIBC Outcomes and Measures - 2017-18 - March 2017
- > #17930187-Strategic Asset Plan
- > #19525746-Statement of Corporate Intent 17-18
- > #20268916-Listing of documents for 11 - Capital Expenditure Planning
- > #2367933-Asset Acquisition Guideline
- > #2721044-Program Management Guideline
- > #428675-S336 Capitalisation Decision
- > #428676-PCY263 Capitalisation policy
- > #6708447-PCY245 Capital Investment
- > #7093524-S457 Capital Investment Standard

- > #9431299-Corporate Budget Planning and Pricing Timetable 2017-18 into 2018-19 including macro budget
- > Board Memo - Asset Investment Program 2018-19 - 2022-23
- > End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - December 2016
- > End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - June 2017
- > End of Month Report - Combined PMB and AIB Capital Program Delivery Report - AIMC - March 2017

Review of the Asset Management System

- > #17545151-AM Maturity Assessment Procedure
- > #17930187-Strategic Asset Plan
- > #17982389-Asset Management Maturity Review - 2017 03 Final v1
- > #19132591-Corporate Assurance Map 17-18
- > #20186938-Asset Management Strategy
- > #20252087-Listing of documents provided for Review of AMS
- > #763330-Accountabilities Framework (20 April 2018 version)
- > #14247282-Asset Management System Manual
- > #14970739-MR&A Review and Audit Program 16 -17
- > #15729220-BPS09 Infrastructure Asset Management
- > #16800150-Management of AMSR Procedure

General

- > #17653910-AMSR 2015 - Summary of Recommendations and Actions
- > #19882629-AMSR 2018 - Risk Management Reference Material presentation