AECOM

Expenditure review of Essential Water's services

INDEPENDENT PRICING & REGULATORY TRIBUNAL

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Quality information

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Revision History

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1	22 March 2022	Updated Final	Mike Stoke	Project Director

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Glossary

Term	Definition
AER	Australian Energy Regulator
BOM	Bureau of Meteorology
CAM	Cost Allocation Methodology
EPA	Environmental Protection Authority
ERP	Enterprise Resource Planning
FFP&E	Furniture, Fittings, Plant and Equipment
FTE	Full Time Equivalent
ICT	Information and Communications Technology
ILI	Infrastructure Leakage Index
IPART	Independent Pricing and Regulatory Tribunal
IVMS	In-Vehicle Monitoring Systems
IVR	Interactive Voice Response
IWCMS	Integrated Water Cycle Management Strategy
KPI	Key Performance Indicator
O&M	Operations and Maintenance
RAB	Regulatory Asset Base
STP	Sewerage Treatment Plant
The Pipeline	The Broken Hill Pipeline
WAMP	Water Asset Management Plan
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant
2019 Pricing Determination	The period 1 July 2020 to 30 June 2022
2022 Pricing Determination	The period 1 July 2023 to 30 June 2027

Executive Summary

Essential Water is a business unit within Essential Energy that provides water and wastewater services to Broken Hill and some surrounding areas and is subject to regulation by the Independent Pricing and Regulatory Tribunal NSW (IPART), which sets the maximum prices that public water utilities can charge for supply of their services based on an assessment of efficient costs. AECOM was engaged by IPART to determine Essential Water's efficient operating and capital costs, and this report provides our findings and recommendations.

Asset Management Practices and Processes	We found that Essential Water's asset management practices generally align with good practice and reflect a commitment to managing assets using a risk-based, lifecycle approach. We identified some opportunities for efficiency and process improvement mostly through documentation of practices and processes to ensure that asset management is practiced consistently across the business. Essential Water's work order history indicates relatively high levels of reactive maintenance. Better predictive maintenance would reduce the number and cost of interventions needed, and we consider that this improvement could be accommodated within the existing budget.
Cost Allocation and Corporate Overheads	Essential Water's proposed cost allocation method for the 2022 Determination Period includes the allocation of corporate overheads in accordance with the Essential Energy Cost Allocation Manual (CAM) which specifies the use of total direct costs (including capital costs) to allocate corporate overheads (shared costs). Essential Water has then applied additional adjustments: • Removal of shared costs that are not relevant to the water business from the pool of costs allocated to Essential Water. • Further reductions of 50% made to cost items over $0.2 million. The use of direct costs for allocation is commonly used in the water sector, but Essential Water appear to have included external costs such as contractors in the receiving cost pool, which we consider problematic in that the contractors are already recovering their own overhead. Overhead should be allocated to staff engaged in managing a contractor, but the value of the contract itself is not a driver for corporate costs. We note in the case of Essential Water that this approach has been approved by the Australian Energy Regulator (AER) for use by Essential Energy, and since Essential Water is a minor business unit a change to this approach may not be practical for Essential Energy or material to Essential Water. We do not recommend a change to the cost allocation method. We found that the efficiency adjustments proposed following the CAM allocation are effective in reducing the amount of corporate overhead allocated to the Essential Water business, however the basis for the second adjustment (50% of items over $0.2 million) appears arbitrary and designed to meet a specific allocation target. Essential Water has suggested that this adjustment may not carry over to future pricing periods, which means that the corporate overhead allocation may increase after this period. We consider that the principles applied to the corporate overhead allocation should be applied consistently and therefore should apply to FY22 as well.
Operating Costs in the 2019 Determination Period (Section 6.1)	We found that operating costs for the 2019 Determination Period were generally efficient, with costs in categories other than overhead and labour coming in below the IPART allowances. The significant increase in labour costs in FY21 was attributed by Essential Water to a more accurate attribution of support costs to direct labour. We support a transfer of costs to a direct category where reasonable but expect this exercise to be cost neutral. We recommend that a minor adjustment be made to total operating costs to balance the labour cost increase reported (only part of the cost increase has been offset via other cost categories).
Operating Costs in the 2022 Determination Period (Section 6.2)	We found that proposed costs in most of the operating cost categories are efficient and reflect continued savings due to the introduction of the pipeline, for example, materials and energy cost reductions achieved in the 2019 Determination Period have been carried through to the 2022 Determination Period. Some exceptions are noted to this finding, such as labour and fleet costs.

	Labour costs are relatively high in comparison with previous years, particularly considering the proposed full time equivalent (FTE) base has reduced over time. Essential Water attributes these higher costs to the need to cover increasing leave arrangements for its ageing workforce and an increased training requirement for new staff. Essential Water has outlined initiatives for which cost efficiencies are identified as benefits (including the Corporate Transformation program, the decommissioning of the Menindee Pipeline and the Wills St Sewage Treatment Plant replacement), but these cost savings are not reflected in proposed labour costs. We recommend including these as ongoing reductions in labour costs from the year after each initiative is expected to be complete. Recommended savings from the corporate transformation program are applied at a total operating cost level. A similar issue applies to fleet costs which are also relatively high and do not reflect the benefit of an Essential Energy initiative to reduce the average age of the fleet. We do not accept Essential Water's approach to forecasting hire services expenditure. It is our view that the forecast should be based on a bottom-up analysis of contractor requirements by activity rather than an extrapolation of the mean of historical costs. In the absence of this, we have sought to remove one-off expenditures from the calculation of the regular/base work pattern for contractor works to estimate regular (ongoing) contractor costs.
Sourcing of Bulk Water	The WaterNSW Pipeline to Broken Hill has been in operation since FY19 and provides a reliable and cost-effective source of bulk water. Essential Water has stated that it services approximately 99% of its demand from the pipeline. We note that 95% of the cost to Essential Water of this service is fixed (independent of demand), and that demand is currently about at minimum allowed flow rates. It is not clear that continued use of the Stephens Creek reservoir provides any value to Essential Water customers, and a decision to review its use could deliver cost savings. An allowance has been made within Essential Water's Pricing Proposal to review the costs and benefits of the reservoir, and we found this allowance to be prudent.
Essential Water's Performance in Relation to its Peers (Sections 6.3 and 8)	We reviewed Essential Water's performance in several areas in relation to its peers in Australia. In comparison to its peer group, Essential Water's operating cost per connection has been consistently higher. Its rates of mains breaks and chokes are also consistently higher, but its rate of customer complaints is significantly lower. These performance issues are not clear from review of the output measures used by Essential Water. We consider that the output measures proposed (and partially reported on) are insufficient and recommend a set of measures that are more customer focused, with a specific emphasis on service relaibility. In comparison with its peers in this area, Essential Water has had a lower *number* of supply interruptions, but significantly longer average *duration* of supply interruption for unplanned works.
Capital Costs in the 2019 Determination Period (Section 7.2)	There appear to have been delays in the delivery of the proposed capital program during the 2019 Determination Period, resulting in significant underspend in FY20 and FY21. Projected spend for FY22 is significantly higher than IPART allowances for that year and Essential Water has suggested that some project costs are likely to extend into the 2022 Determination Period, such as the commissioning of the Grazier's Pipeline and the subsequent decommissioning of the Menindee Pipeline.
Capital Costs in the 2022 Determination Period (Section 7.3)	Essential Water has proposed a significant capital program over the 2022 Determination Period, including several small projects and two major projects (the Wills St Wastewater Treatment Plant (WWTP) replacement and Water and Sewer Reticulation Repairs). We reviewed the major projects in detail and the remainder at a summary level, except for some minor adjustments we have found most to be reasonable and efficient. The Wills St WWTP replacement has a clear cost driver, and it would be prudent to proceed. We found, however, that the cost estimates provided present a significant cost risk because the allowances included for design and contingency are very low for a project that is still in pre-design (concept) stage. A detailed risk analysis has not been undertaken for the project and therefore has not been incorporated in the cost estimates. We recommend that IPART review the project in detail ex-post.

We recommend an adjustment (deferral) of the capital costs for the Concrete Remediation Project at Mica St Water Treatment Plant (WTP) because we do not consider the works to be urgent (we recommend an ongoing monitoring program instead).

We recommend that improvements be made in relation to the content and detail of business cases for Essential Water capital projects.

Summary of Recommended Efficient Costs

Table 1 presents a summary of our recommended adjustments to Essential Water's proposed total expenditure and recommended efficient costs over the 2019 Determination Period. Total recommended efficient costs over the 2019 Determination Period are $3.7 million (or 2.2%) lower than Essential Water's actual/projected costs for the period.

Table 1 Recommended Efficient Expenditure Over the 2019 Determination Period ($ Millions, Nominal)

	FY20	FY21	FY22	Total
Essential Water Costs				
Operating expenditure	$38.81	$39.57	$42.23	$120.61
Capital expenditure	$10.48	$9.74	$28.03	$48.25
Total	**$49.29**	**$49.31**	**$70.26**	**$168.86**
AECOM Recommended Adjustments				
Operating expenditure		-$0.13	-$1.25	-$1.38
Capital expenditure			-$2.29	-$2.29
Total		**-$0.13**	**-$3.55**	**-$3.67**
Percentage Change		**-0.3%**	**-5.0%**	**-2.2%**
Efficient Costs				
Operating expenditure	$38.81	$39.44	$40.98	$119.23
Capital expenditure	$10.48	$9.74	$25.74	$45.95
Total	**$49.29**	**$49.18**	**$66.72**	**$165.19**

Table 2 presents a summary of our recommended adjustments to Essential Water's proposed total expenditure in $FY22 and recommended efficient costs over the 2022 Determination Period. Total recommended efficient costs over the 2019 Determination Period are $8.5 million (or 3.1%) lower than Essential Water's proposed costs. The application of the continuing efficiency adjustment reduces this by a further $5.1 million.

Table 2 Recommended Efficient Expenditure Over the 2019 Determination Period ($ Millions, $FY22)

	FY23	FY24	FY25	FY26	FY27	Total
Essential Water Costs						
Operating expenditure	$39.96	$39.13	$38.95	$39.07	$38.31	$195.42
Capital expenditure	$22.25	$22.43	$16.66	$6.87	$6.81	$75.02
Total	**$62.21**	**$61.56**	**$55.61**	**$45.94**	**$45.12**	**$270.45**
AECOM Recommended Adjustments						
Operating expenditure	-$0.53	-$0.47	-$1.19	-$2.00	-$1.69	-$5.87
Capital expenditure	-$2.81		$0.12		$0.11	-$2.58
Total	**-$3.35**	**-$0.47**	**-$1.07**	**-$2.00**	**-$1.58**	**-$8.45**
Percentage Change	**-5.4%**	**-0.8%**	**-1.9%**	**-4.3%**	**-3.5%**	**-3.1%**
Efficient Costs						
Operating expenditure	$39.43	$38.66	$37.76	$37.08	$36.62	$189.55
Capital expenditure	$19.44	$22.43	$16.78	$6.87	$6.93	$72.44
Total	**$58.87**	**$61.09**	**$54.54**	**$43.94**	**$43.55**	**$261.99**
Efficient Costs, Including Continuing Efficiency Adjustment						
Operating expenditure	$39.15	$38.13	$36.98	$36.05	$35.35	$185.66
Capital expenditure	$19.30	$22.12	$16.43	$6.68	$6.69	$71.21
Total	**$58.46**	**$60.24**	**$53.40**	**$42.72**	**$42.04**	**$256.87**

1. Introduction

1.1 IPART

Under the *Independent Pricing and Regulatory Tribunal Act 1992*, the Independent Pricing and Regulatory Tribunal (IPART) NSW is charged with regulating the prices for monopoly services such as energy, public transport and water. As part of this, it is required to review and set the maximum prices that public water utilities can charge for supply of their services. Generally, prices charged by utilities will allow recovery of efficient costs.

To assess the efficiency of water utilities' costs, IPART undertakes pricing reviews for each regulated utility at intervals (usually ranging between three and five years). Utilities are required to submit a pricing proposal to IPART outlining its proposed operating and capital costs. Typically, IPART will engage a consultant to review the costs and provide recommendations to IPART in making its determination.

IPART is in the process of conducting a review of Essential Water's water and wastewater pricing proposal for the 2022 Determination Period, to establish the maximum prices it may charge customers from 1 July 2022 for a period of up to five years.

1.2 Essential Water

Essential Water is a relatively small business unit of Essential Energy that provides water and sewerage services to customers in Broken Hill and surrounding areas.

Essential Water's water and wastewater infrastructure includes:

- 597 km of water and sewer mains
- 2 water treatment plants (WTPs)
- 2 reservoirs (Stephens Creek and Umberumberka Creek reservoir)
- 8 service reservoirs
- 4 raw rainwater tanks
- 1 emergency dam supply
- 3 active water pumping stations
- 2 wastewater treatment plants (WWTPs)
- 11 sewage pumping stations.

Essential Water serves a slowly declining population in a remote location who have limited capacity to pay. It sources bulk water from the Wentworth to Broken Hill Pipeline, which has been a reliable bulk water supply. Water sales volumes and bulk water costs have been relatively stable, but Essential Water's infrastructure is ageing, and investments are required to continue to meet standards.

Key drivers of Essential Water's expenditure proposal include:

- Capital expenditure to upgrade the Wills Street WWTP,
- Capital expenditure to repair and replace parts of the water and sewer reticulation system,
- Higher operating expenditure than previously allowed.

Much of the expenditure required for the Wills Street WWTP upgrade was deferred in the last price determination, and Essential Water's proposal indicates that urgent action is now required to meet its Environmental Protection Authority (EPA) licence conditions. Similarly, capital expenditure on the water and sewerage reticulation networks has been proposed to repair or replace ageing infrastructure. With regards to its operating costs, Essential Water has cited an ageing workforce, increased corporate costs and a redundancy freeze as being responsible for the higher than previously allowed for costs.

AECOM was engaged by the IPART to provide advice and guidance to assist IPART to determine the prudency and efficiency of Essential Water's capital, operational, maintenance and administrative costs for the 2022-2027 Determination Period. This report presents the findings of this review.

1.3 Scope of the Review

AECOM has undertaken a desktop review to assist IPART in determining the prudency and efficiency of Essential Water's operational, maintenance, administrative and capital costs.

Table 3 Expenditure review of Essential Water's Services

Task A.1 Review planning and asset management practices and processes	• Assess whether Essential Water's proposed expenditure is in line with good asset management and strategic business planning, and if not, what impacts would better planning have on its proposed expenditure and service levels. • Assess whether the proposed approach to meeting water demand is efficient, specifically its decision-making process on sourcing water from the pipeline or its own infrastructure. • Assess how Essential Water considers climate change in its planning processes.
Task A.2 Review operating expenditure	• Review the actual operating expenditure incurred over the 2019 Determination Period and forecast operating expenditure for the 2022 Determination Period, using any relevant findings from Task A.1 and any relevant findings from the 2019 review of Essential Water's expenditure. • Comment on how the utility's proposed operating expenditure compares to other similar water utilities, and what conclusions can be drawn from that comparison, if any. • Comment on the reasonableness of the utility's cost allocation methodology principles, how it has attributed costs (direct and shared costs such as overheads), and whether there has been any inappropriate allocation of shared costs (e.g., double counting). • Assess and identify the potential for and recommend any efficiency savings in the 2022 Determination Period and provide annual efficient operating expenditure estimates with reasoning to support any recommended savings.
Task A.3 Review capital expenditure	• Using any relevant findings from Tasks A.1 and A.2 and any relevant findings and recommendations from the 2019 review of Essential Water's expenditure. • Review efficient capital expenditure over the 2019 Determination Period. • Assess and recommend the efficient level of capital expenditure over the 2019 Determination Period, providing rationale to support any difference from the utility's proposed actual level of capital expenditure. • Review of efficient capital expenditure for the 2022 Determination Period. • Agree a sample of projects from the capital expenditure proposal for assessment. Assess project evaluation and planning (e.g., robustness of the business case). • Assess the potential for and recommend any efficiency savings in the proposed capital expenditure for the 2022 Determination Period and provide annual efficient capital expenditure estimates with reasoning to support any recommended savings. • Assess the appropriateness of proposed asset lives used to calculate regulatory depreciation (or 'return of capital') and recommend adjustments if appropriate.
Task A.4 Review output measures	• Using any relevant findings from Tasks A.1 to A.3: • Assess the utility's performance against the output measures over the 2019 Determination Period. Where output measures have not been achieved, comment on the reasons for this. • Recommend a set of new output measures for the utility's proposed operating and capital expenditure program, for the upcoming determination period. Recommendations, if any, should be directly linked to efficient customer outcomes.

1.4 Report

The structure of this report follows the methodology outcomes as outlined in Table 4.

Table 4 Report Structure

Executive Summary	
Section 1	Introduction and Scope of Review
Section 2	Assessment Methodology
Section 3	Key Issues
Section 4	Review of Practices and Processes
Section 5	Review of Cost Allocation Methodology
Section 6	Review of Operating Expenditure
Section 7	Review of Capital Expenditure
Section 8	Review of Output Measures
Section 9	Findings and Recommendations

All operating costs and forward capital costs in this report are presented in $FY22 unless otherwise stated. Historical capital costs are presented as actuals.

1.5 Summary of Essential Water's Pricing Proposal

This section provides a summary of the historic and proposed capital and operating expenditure outlined in Essential Water's June 2021 submission. Figures for FY21 (which were forecast in the June 2021 submission) have been replaced with actuals.[1] The operating and capital expenditure are analysed in detail at Sections 6 and 7 respectively.

1.5.1 Capital Expenditure

During the 2019 Determination Period, Essential Water expects to incur a total of $48.2 million in capital expenditure (in nominal terms), which was $5.6 million (or 10%) below IPART's allowances. This is represented graphically in Figure 1, where the coloured columns represent the actual costs incurred, and IPART allowances are represented by the black markers. Essential Water's proposed costs for the period are also shown, represented by the light blue markers.

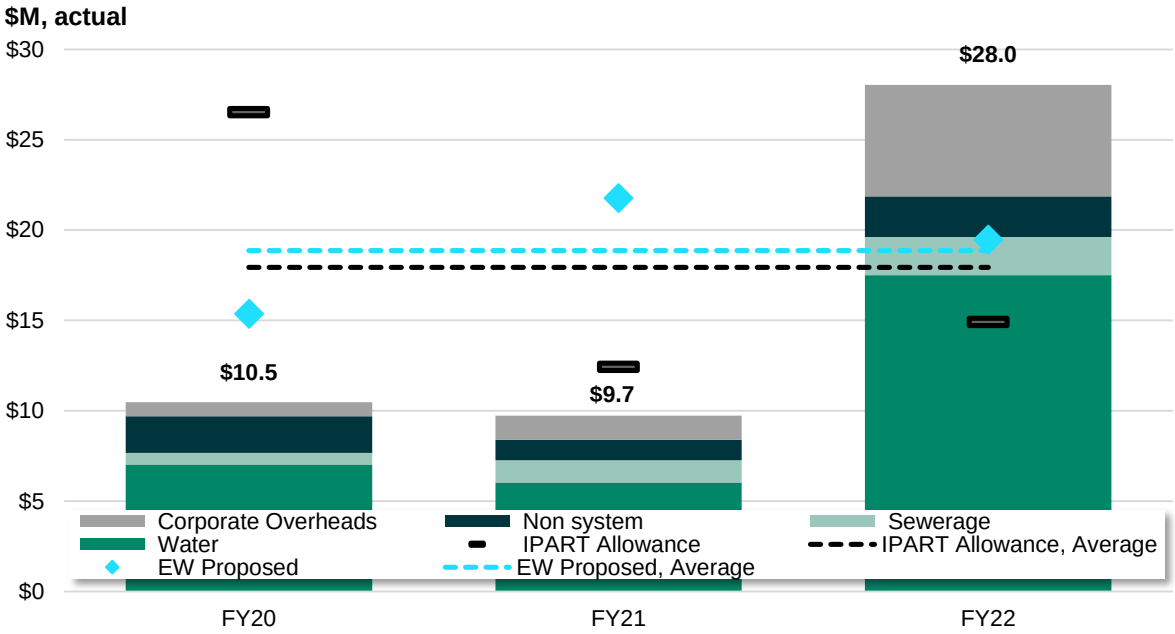

Figure 1 Capital Expenditure Over the 2019 Determination Period ($ Millions, Nominal)

The tabulated figures are provided at Table 5. The majority (63%) of the expenditure was for water system works, with 8% for sewerage system works, 11% for non-system expenditure and 17% being allocated corporate overhead costs.

Table 5 Capital Expenditure Over the 2019 Determination Period ($ Millions, Nominal)

Actuals	FY20	FY21	FY22	Total
Non system	$2.03	$1.14	$2.24	**$5.41**
Water	$7.03	$6.03	$17.51	**$30.57**
Sewerage	$0.64	$1.23	$2.12	**$3.98**
Corporate Overheads	$0.77	$1.34	$6.17	**$8.28**
Total	**$10.48**	**$9.74**	**$28.03**	**$48.25**
IPART Allowance	$26.51	$12.42	$14.89	**$53.81**
EW Proposed	$15.37	$21.77	$19.47	**$56.60**

Essential Water's proposal for the 2022 Determination Period includes capital expenditure of $75.0 million (in $FY22). This is represented graphically in Figure 2.

[1] *Essential Water 2020 AIR_SIR_FY21 actuals update_11Oct2021.xlsx*

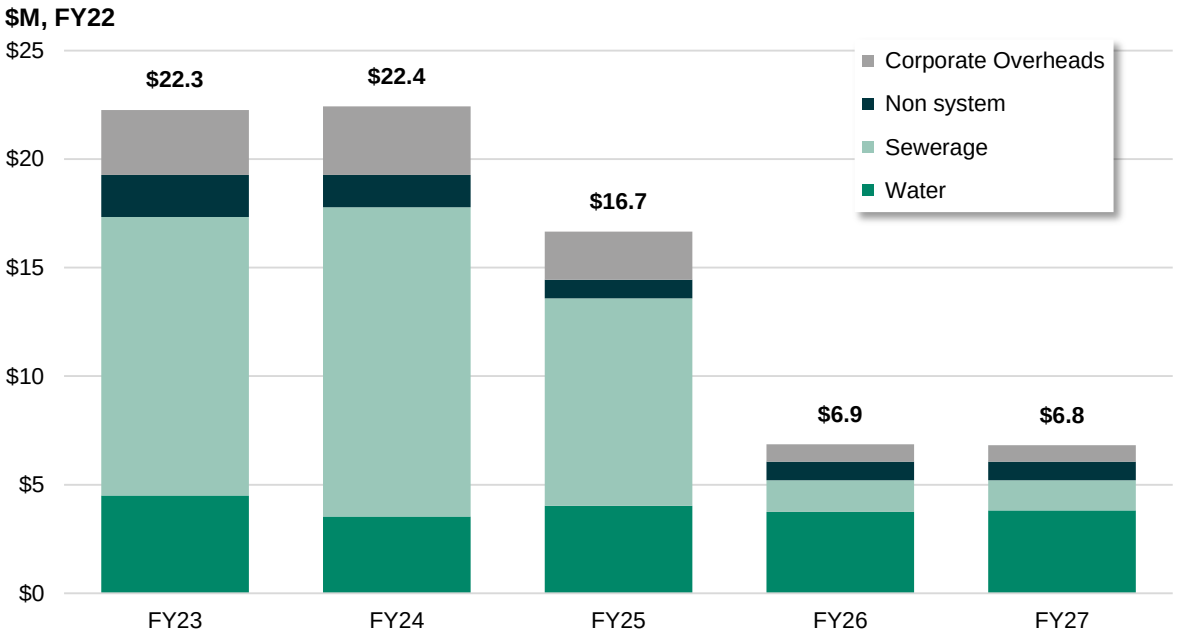

Figure 2 Proposed Capital Expenditure Over the 2022 Determination Period ($ Millions, $FY22)

The tabulated figures are provided at Table 6. The majority (53%) of the expenditure is for sewerage system works, with 26% for water system works, 8% for non-system expenditure and 13% being allocated corporate overhead costs.

Table 6 Capital Expenditure Over the 2022 Determination Period ($ Millions, $FY22)

Actuals	FY23	FY24	FY25	FY26	FY27	Total
Non system	$1.94	$1.48	$0.85	$0.86	$0.86	**$5.99**
Water	$4.50	$3.53	$4.03	$3.75	$3.82	**$19.63**
Sewerage	$12.83	$14.25	$9.56	$1.45	$1.39	**$39.48**
Corporate Overheads	$2.98	$3.16	$2.22	$0.81	$0.75	**$9.92**
Total	**$22.25**	**$22.43**	**$16.66**	**$6.87**	**$6.81**	**$75.02**

An overview of the proposed expenditure by project is outlined in Table 7 and Table 9. The Wills Street WWTP Replacement (which was deferred from the 2019 Determination Period) is the most significant project by value, amounting to 46% of the total forecast expenditure (excluding overheads).

Table 7 Summary of CAPEX Projects in 2022 Determination Period

Project	Total ($millions, $FY22)
Wills Street Wastewater Treatment Plant Replacement	$29.90
Broken Hill Water and Sewer reticulation repair and replacement	$10.70
Non-system asset expenditure: Information Technology	$3.50
Mica Street Service Reservoir Replacement	$3.10
Mica Street Water Treatment Plant Concrete Remediation	$2.50
Non-system asset expenditure: Motor vehicles	$1.90
Rocky Hill Service Reservoir Refurbishment and Replacement	$1.90
Non-system asset expenditure: Buildings	$0.40
Non-system asset expenditure: Furniture, Fittings, Plant and Equipment	$0.20
Other water and sewerage	*$11.00*
Total Capital Expenditure, Excluding Overheads	**$65.10**
Corporate Overheads	$9.92
Total	**$75.02**

Source: Pricing Proposal by Essential Water June 2021

1.5.2 Operating Expenditure

Essential Water's historical and proposed operating expenditure (expressed in $FY22) from FY16 to FY27 is provided at Figure 3. The coloured bars represent actual costs (up to FY21) and forecast costs from FY22 to FY27.

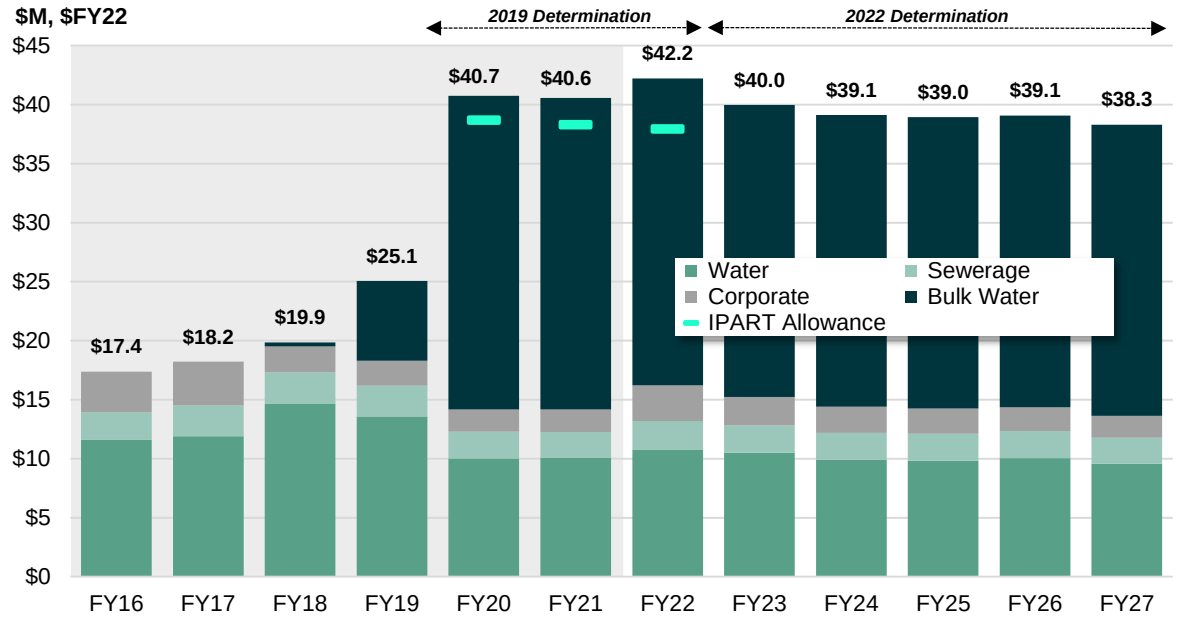

Figure 3 Operating Expenditure ($ Millions, $FY22)

Water supply costs have increased substantially with the introduction of the Broken Hill Pipeline which came into operation in 2019, with bulk water purchases representing most of the total operating cost from this point.

A summary of operating expenditure over the 2019 Determination Period is provided at Table 8.

Table 8 Summary of Operating Expenditure for the 2019 Determination Period ($ Millions, $FY22)

	FY20	FY21	FY22
Corporate	$1.87	$1.91	$3.02
Bulk Water	$26.57	$26.37	$26.03
Water	$10.03	$10.09	$10.75
Sewerage	$2.26	$2.18	$2.44
Total	**$40.74**	**$40.56**	**$42.23**

A summary of operating expenditure over the 2022 Determination Period is provided at Table 9.

Table 9 Summary of Proposed Operating Expenditure for the 2022 Determination Period ($ Millions, $FY22)

	FY23	FY24	FY25	FY26	FY27
Corporate	$2.42	$2.23	$2.14	$2.02	$1.86
Bulk Water	$24.74	$24.72	$24.71	$24.70	$24.67
Water	$10.52	$9.92	$9.85	$10.05	$9.59
Sewerage	$2.28	$2.25	$2.25	$2.30	$2.19
Total	**$39.96**	**$39.13**	**$38.95**	**$39.07**	**$38.31**

2. Assessment Methodology

Our methodology for assessment is presented in the sections below.

2.1 Operating Expenditure

AECOM's methodology for the review of operating expenditure is presented in Figure 4.

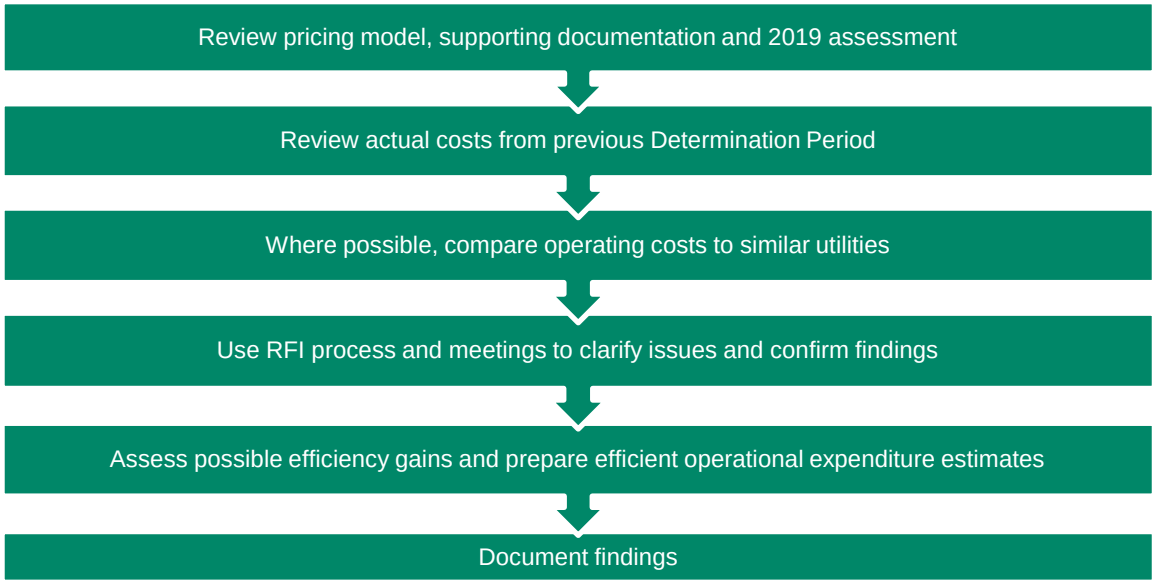

Figure 4 High level methodology for operating cost review

2.2 Capital Expenditure

For the assessment of the capital expenditure, our overarching methodology is presented in Figure 5. More detail is provided in the sections following.

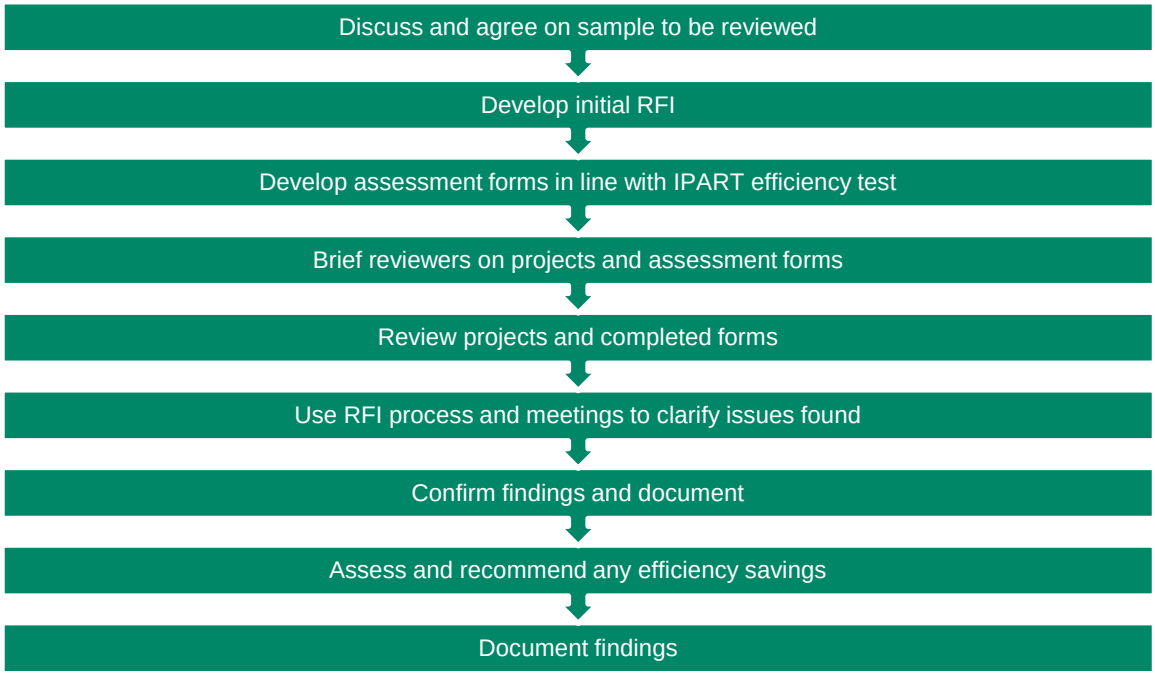

Figure 5 High level methodology for Capital Review

2.2.1 Assessment Template

A standard project assessment template was developed using the IPART efficiency test criteria as a guide. The template includes a series of questions to be answered by reviewers which guide the efficiency assessment. The template ensures consistency in the technical and costs assessments by all reviewers and is a key element in demonstrating transparency in our review. Each reviewer was briefed on the format of the assessment and how to complete the forms. The completed forms are the basis for the capital expenditure assessment.

For this project we developed a long form assessment template for the detailed project reviews, and a short form for those projects in the sample that we have reviewed at a summary level. Figure 6 presents the long form assessment template, which has been used to complete the detailed project reviews.

Technical Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
1, 2	Were/are the works reasonably required to address risks to agreed service levels or continue to deliver agreed service levels?				
1	Were/are the works reasonably required to address a legal or compliance obligation (safety, environmental or other legislative requirements)?				
1	Were/are the works reasonably required to fulfil regulatory obligations such as those specified in a water management protocol, resource operation plan, resource operation licence or interim resource operations licence?				
	For renewal projects - is the timing of the renewal appropriate:				
1, 2	*Based on the condition of the asset*				
3	*Based on a risk-based approach to replacement? Has service life been appropriately estimated?*				
2	Is there any evidence of customer consultation, and were the outcomes of this consistent with the scope of works proposed?				
5	Were/are alternatives evaluated (including an option analysis undertaken) as part of the scoping process?				
5	Were non-capex options considered? (e.g. operational solutions)				
5	Is the scope of the works the best means of achieving the desired outcomes?				
5	Were any learnings applied from prior projects in the development of the project scope?				
5	Does the (proposed) standard of the works conform with technical, design and construction requirements in legislation, industry and other standards, codes and manuals?				
5	Is the (proposed) standard of works compatible with existing and adjacent infrastructure or modern engineering equivalents?				
5	Outline any considerations relating to technological change, process redundancy and/or cost associated with improving general business performance.				

Technical Review Summary

Is the project efficient from a technical perspective?		**Documentation quality**	
Comment on efficiency			

Cost Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
3	Was/is the incurred/proposed cost reasonable for the scope of the project?				
3	Was/is the cost of the defined scope and standard of works consistent with conditions prevailing in the markets for engineering, equipment supply and construction?				
3	Was/is the allowance for indirect costs reasonable for the scope of the project?				
4	Were/are suitable approaches taken for managing risk and uncertainty regarding projects at an early stage of development?				
4	Does the organisation have access to the resources required to deliver the works within the proposed time frames?				
4	Was/is the proposed delivery method and project plan appropriate, and likely to result in the desired outcomes?				
3	Was/are the proposed cost escalation methods appropriate? (e.g. consistent with prevailing market conditions and historical trends)				
5	Were options considered in determining the least cost or preferred option?				
5	Were the procedures/approach used for determining the preferred option appropriate in terms of determining efficient and least cost outcomes?				
5	Is there a robust basis for the estimated project costs? i.e. Is there any evidence of estimates being informed by prior projects (specifically, the variance between actual costs for completed projects and their original estimated costs)?				
3	Did the project consider whole-of-life costs, including future maintenance and operating costs?				
3	Have any potential efficiency gains been identified?				
4, 5	Was/is the adopted/proposed procurement methodology appropriate and consistent with approved procurement policy?				

Technical Review Summary

Is the project considered efficient from a cost perspective?		**Documentation quality**	
Comment on efficiency			

Figure 6 Long Form Project Assessment Template

2.2.2 Project Documentation Assessment

Each project has been reviewed for efficiency, and recommendations have been made based on:

- Review of project documentation provided by Essential Water and supplemented by a request for information (RFI) process.
- Information provided during meetings with Essential Water.
- The judgement of the technical reviewers.

We reviewed project documentation provided to inform our efficiency assessment. We assessed the suitability (in terms of quality and range) of the documentation provided by Essential Water for each project in the sample and used a scoring system to indicate the degree to which existing documentation enables an assessment to be made on each project; and highlighted areas where documentation could be improved for future reviews and for better internal project controls. In summary:

- The quality of documentation is **high** where the documentation alone was sufficient to make sound recommendations. This rating indicates that all information required to make the recommendation was documented and available, to a sufficient level of quality.
- The quality of documentation is **medium** where there was insufficient quantity and range, but when supplemented by interviews, informal documentation and/or professional judgement, supported a conclusion of prudency.
- The quality of documentation is **low** where the documentation provided was inadequate in range or quality, and our reviewers were reliant on professional judgement to make sound recommendations.

3. Key Issues for this Determination

This section outlines some of the key issues and considerations that have set the context for our review.

3.1 Recommendations from Previous Determination Period

Several recommendations were made by IPART and Aither in the previous determination. These are presented in Table 10, along with comment on their current status.

Table 10 Recommendations from 2019 Determination Period

No	Source	Topic	Recommendation / Findings	Commentary
1	Aither	Demand planning	There is no explicit long-term supply demand planning for Essential Water as there is currently no forecast increase in the demand for water in either the short or long-term. We consider this to be reasonable given the circumstances of Broken Hill, however we are of the view that Essential Water should continue to monitor the situation (adopt a 'watching brief') and develop a long-term supply demand plan if circumstances in the region change in the future.	• Development of the Integrated Water Cycle Management Strategy (IWCMS) is evidence of long-term planning. The IWCMS indicates that there is sufficient capacity to meet demand in the foreseeable future (even with the potential new mine development). • Forecast customer numbers for potable water differ between IPART submission (pg. 71) and IWCMS 2021 (pg. 41). Projections in the IWCM include 3ML/day allowance for Cobalt Blue Mine, but is excluded in Essential Waters submission, with Essential Water proposing to address this through the demand volatility mechanism.
2	Aither	IT / data	There remains heavy reliance on spreadsheets for much information and renewal decision making processes. These are maintained by individuals and quality varies, and without a corporate system backing there are associated risks of data loss, verification issues and consistency of analysis leading to inefficient decision making over time.	• Continued implementation of integrated asset management & geographical information system to track condition data / system performance. No specific evidence of application of system to inform capital strategies (Water Asset Management Plan (WAMP), pg. 17). • Procurement of risk optimisation tool completed as part of Corporate Transformation Program. The WAMP has not been updated to reflect this (Essential Water Submission, pg. 63). • Procurement of Enterprise Asset Management System is planned as part of the Corporate Transformation Program (Essential Water Submission, pg. 63).
3	Aither	Risk	The risk register is comprehensive and aligned with a clear framework. However, application of risk principles in decision making on projects appears deficient. On critical projects reviewed there was no clear application of the framework to risk / cost trade-offs nor any quantitative assessment of risks.	• The latest water quality risk assessment was undertaken in 2019 (IWCMS 2021, pg. 23).
4	Aither	Business cases	Corporate business cases aligned with documented requirements containing clear statements of need, cost development, options presented etc. However, there were inconsistencies on contingencies allowances, analysis of options and overhead applications which creates difficulty in reviewing prudency and efficiency. There was little evidence of sensitivity testing on decision or risk.	• Business cases consider need statements, costs, options, etc. • Issues with estimation of contingency are noted in this review (refer Section 7.3)

No	Source	Topic	Recommendation / Findings	Commentary
5	Aither	Documentation	There was little evidence showing that practices applied by personnel are clearly documented. Without such practices, transparency in decision making is not possible and outcomes will vary between individuals.	• This does not appear to have been addressed (i.e., there is no evidence of additional workflow processes, for example).
6	Aither	Performance against output measures	Essential Water has identified its inability to measure itself against its response time targets as an issue and specifies it will implement appropriate procedures to capture performance. Aither advises that these procedures should be in place prior to the beginning of the 2019 Determination Period. In addition to these procedures, we recommend that further improvements are made to collecting data to measure Essential Water's performance against output targets. This will help with communication with customers regarding the level of service they are receiving and future regulatory reviews.	• There is a gap in performance data collection for notifying customers of planned works (IWCMS 2021, pg. 9). • There is a gap in procedure to measure water and sewerage response times, with only periodic customer surveys conducted at this stage (IWCMS 2021, pg. 9).
7	IPART	Customer consultations	That Essential Water should conduct customer consultations, ahead of the next determination period, to better understand the costs of treating trade waste and the prices that should be set to recover these costs.	• Woolcott Research were engaged to undertake a customer survey (April 2021).

3.2 Issues Paper

As part of the pricing review, IPART has produced an Issues Paper[2] which outlines the notable issues being considered for this determination. The paper seeks comment from stakeholders on several issues. We have summarised these in the following sections, including how we have approached the issue in our review.

Stakeholder submissions in response to the issues paper have been made public on IPART's website.

3.2.1 Government Subsidy

The recent commissioning of the Broken Hill Pipeline has provided additional water security to Essential Water customers, where drought and water quality issues were affecting availability of water. The Pipeline was built under a NSW Government Direction.

The construction and use of the pipeline has seen bulk water supply costs rise significantly for Essential Water. The NSW Government is committed to subsidising Essential Water's prices until 30 June 2023, but it appears that no clear commitment has been made by the government to continue this subsidy. Essential Water, in its pricing proposal, has proposed that NSW taxpayers fund an expanded subsidy of approximately $27 million per year over the proposed five-year Determination Period to maintain affordability for its customers.

The presence of any proposed subsidy, while it has the potential to affect prices, has not affected our assessment of Essential Water's proposed costs.

3.2.2 Major Projects

Two major capital projects are proposed for the upcoming determination period – the Wills St WWTP and the water and sewer reticulation repairs projects. These represent significant costs to customers over the period and we have therefore included these projects for detailed review in our assessment.

[2] IPART, *2021 Review of Essential Energy's water and wastewater prices for Broken Hill: Issues Paper*, September 2021

3.2.3 Determination Period

Essential Water has proposed a determination period of five years for this pricing review, where the previous period was only three years. It considers that its operating environment has become more stable and a five-year determination period will provide more price certainty for its customers. While IPART may decide to reduce this period, we have considered the five years' worth of costs in our assessment.

3.3 The Impact of the Proposed Mine

Cobalt Blue has indicated its intention to establish a cobalt mine in Broken Hill.[3] We understand that a final investment decision is expected on the mine in FY23, and if progressed it will be operational by FY25. Due to uncertainty around the progression of the mine, any forecast demand from the mine has not been included in our assessments. However, if the mine does progress there may be a change in costs to Essential Water.

The mine is projected to require approximately 4 ML per day once operating in FY25 (based on an operating requirement of 1.5 GL per year). Essential Water currently draws around 8ML per day from the new Broken Hill Pipeline, which is the minimum contracted daily volume. If Essential Water were still to be drawing 8 ML per day itself, then its share of the fixed cost component of the cost of bulk water may theoretically reduce by approximately one third (assuming no change to the Government subsidy at that time).

3.4 Essential Energy Transformation Program

Essential Water's proposal refers to a significant program of works undertaken by Essential Energy to increase efficiency across the business. The costs for this program are reported as being approximately $250 million, with efficiencies expected to be fully realised by FY25. Individual costs and expected savings were not identified, but the following initiatives were identified as part of the program:

- Enterprise Resource Planning (ERP) system – more efficient HR processes and procurement
- Field Portal Digital tools - digitisation of paper-based forms, improved field operations
- Customer Contact System (ServiceNow) – improved workflows and interactions with customers
- Interactive Voice Response (IVR) – improved customer call answering system
- In-Vehicle Monitoring Systems (IVMS) – improved safety outcomes
- Copperleaf55 – risk optimisation tool
- Data enablement – improved decision making
- Workforce planning framework
- Cyber Security – improved cyber safety
- Concur – efficient travel and expense management processes.
- Zoom – improved ability to enable remote working
- Capability Uplift – training to enable more efficient contract management
- Increased sophistication of asset management
- Efficient works delivery
- Improved support services
- Improved customer service.

Essential Water's proposal has identified that while many of these initiatives are likely to deliver savings to Essential Water customers, not all are relevant to Essential Water, and as a result, it has made an adjustment to the allocated amounts for those initiatives.

The transformation program has implications for our findings in both the historic and future corporate overheads and operating costs. These are presented in more detail in our analysis of these costs in the sections following.

[3] https://cobaltblueholdings.com/broken-hill/broken-hill-cobalt-project/

3.5 Efficiency Adjustments

Three types of efficiency adjustment have been considered during this review:

- Scope efficiency adjustments – which are made to account for costs relating to specific activities or programs which are not prudent or inefficient.
- Catch-up efficiency adjustments – which are made based on identified improvements that would enable the utility to transition towards an efficient frontier.
- Continuing efficiency adjustments – which are general efficiency improvements that even efficient utilities should be able to realise over time, as more productive ways of working emerge.

In the 2019 review, Aither recommended (and IPART accepted) a 1% p.a. efficiency adjustment to non-labour direct operational expenditure. The adjustment was intended to capture future efficiencies, including the efficiencies expected from the new network configuration (i.e., sourcing of water via the Broken Hill Pipeline). Similarly, in the 2014 Determination a general efficiency adjustment of 1% p.a. was proposed by SKM. In this instance however, IPART applied a 0.5% target instead (considering the relatively small size of the utility). IPART has advised that as a stretch target, a continuing efficiency adjustment of 0.7% p.a. is to be applied for this review.

In this review, where possible we have sought to directly account for expected efficiencies (such as those relating to the revised network configuration, or to corporate transformation) as scope or catch-up efficiency adjustments and have noted the type of adjustment proposed for each.

4. Review of Practices and Processes

AECOM reviewed Essential Water's planning and asset management practices and processes to determine whether they are likely to drive a prudent and efficient outcome. This section reflects the key elements reviewed in line with IPART's scope requirements:

- Asset management planning
- Procurement
- Decision making over source of water
- Climate change planning.

4.1 Summary of Key Findings

In our review, we find that:

- The asset management documents reviewed generally provide a good foundation and high-level overview of Essential Water's approach to asset management. Some improvements have been identified for asset management documentation that we would recommend be implemented by Essential Water:
  - Improve definition around how the documents interact with each other to influence the asset management decisions made. Poor definition can lead to asset management decisions which do not have a clear 'line of sight' to business and asset management objectives.
  - Improve clarity around governance and responsibility for asset management documentation.
  - Improve documentation of the application of planning processes to major capital works, which can make it difficult to ensure that analysis, assessment and evaluation undertaken is not consistent or aligned with Essential Water's defined approach. Examples include quantitative risk assessment/sensitivity testing in business cases, project prioritisation, and lifecycle planning. This finding is similar to Aither's findings in the 2019 review.
  - Improve documentation regarding Essential Water's methodology for identifying, assessing and prioritising continuous improvement opportunities. There is a risk that asset management improvement initiatives implemented are not suitable for the size, capability and maturity of the water business.
- Reactive maintenance works represents approximately 50% of maintenance works delivered, which suggests that effective lifecycle management is not being used to inform maintenance planning. We recommend that Essential Water apply lifecycle management principles to move to a better predictive maintenance regime.
- Essential Water's asset management decision making is informed by multiple data sources/systems. Improvements could be achieved by documented or applied data management processes to reduce risks to data consistency, quality and accuracy. Essential Water should define and document the data quality principles and data collection methods it uses, staff responsibility for asset data, and the interactions between different asset data systems.
- Essential Water's decision making around sourcing water is clear and supported by clear reasoning.
- Essential Water has effectively considered the effects of climate change in their planning processes.

We consider that implementing the changes recommended to asset management processes and documentation should be able to be accommodated within existing cost structures.

4.2 Asset Management Planning

AECOM has undertaken an overall review of Essential Water's asset management practices with reference to best asset management practice, as defined by ISO55000:2014 Standard and the International Infrastructure Management Manual. Using available information, the review involved understanding the extent to which Essential Water's practices and processes were documented and applied by staff and the business.

The findings of the review are outlined in Table 11, and organised by the following elements of asset management:

- Asset management documentation
- Service standards and customer consultation
- Risk management
- Cost forecasting and budget determination
- Delivering asset management activity
- Enabling asset management

- Investment planning
- Performance review and continuous improvement.

Table 11 Review of Essential Water's Asset Management Planning

Category	Review
Asset management documentation	Essential Water's asset management planning and practices are documented in and guided by a set of high-level documents including: • **Asset Management Policy:** Essential Water uses Essential Energy's Asset Management Policy. • **Water Asset Management Plan FY18-27:** The WAMP was last reviewed in September 2021 and provides the strategic overview for the management of physical system assets for the 10-year planning period. The WAMP outlines the scope of Essential Water's asset management system, business objectives and asset management objectives. Essential Water's asset management objectives are generally aligned with and support achievement of the business commitments of supply reliability and security, supply quality, health and safety, environment, and customer service. • **Strategic Plan FY17-23:** The Strategic Plan was last updated May 2018 and provides an overview of the water and sewerage business, as well as the strategic investment plans for the 4-year period starting July 2019. This document includes Essential Water's Human Resource Plan which summarises the primary activities and responsibilities of the groups within Essential Water's business, however description of asset management roles and responsibilities is limited. • **Integrated Water Cycle Management Strategy 2021:** The Integrated Water Cycle Management Strategy (IWCMS) was developed for Essential Water by the NSW Public Works Advisory in 2021 (with the preliminary draft dating back to 2017). The IWCMS outlines the environment and regulatory framework that Essential Water operates in. • **Other policies and procedures:** Essential Water adopts several of Essential Energy's policies and procedures regarding risk management, governance, resource management, environment and customer service. These have not been reviewed and AECOM is unable to determine if these policies and procedures are appropriate for Essential Water's business. Generally, the documents above provide a good foundation and high-level overview of Essential Water's approach to asset management. There is a lack of definition around how the documents interact with each other to influence the asset management decisions that Essential Water and its staff make. Without sufficient context and awareness of these documents, there is a risk that there not a clear 'line of sight' and Essential Water staff may make asset management decisions that do not support business and asset management objectives. As Aither found in its 2019 review, there is limited evidence in the above documents of asset management practices being applied by staff. Furthermore, there is limited evidence of governance and ownership of asset management documentation. The WAMP, Strategic Plan and IWCMS do not specify who is responsible for updating, reviewing, owning, or endorsing the documents, and the WAMP and Strategic Plan do not include the document's revision history. It would be beneficial for Essential Water to develop a responsibility matrix which defines the who is responsible, accountable, consulted and informed (RACI model) for key asset management activities and decisions.
Service standards and customer consultation	The WAMP defines the services Essential Water provides and the relevant stakeholder groups, namely water business customers, shareholders and other stakeholders like regulatory bodies, employees and contractors. There is evidence that Essential Water understands its reporting requirements and communities with stakeholder groups, such as: • The WAMP summarises Essential Water's regulatory requirements for water service performance reporting. Quarterly test results for drinking water quality are published on its website and up to date. • Overview of Essential Waters Pricing Proposal for the current determination period is available on its website. • Essential Water adopts Essential Energy's Customer Service Policy; however, this has not been made available for review. • Essential Water posts intermittent news updates and media releases on its website and manages a Facebook page where incidents or planned works affected its customers is announced. For example, emergency repairs and planned water metering on private property. Levels of Service (LoS) and key performance indicators (KPIs) used to measure performance against these service standards are defined in Strategic Plan and IWCMS. Essential Water's LoS consider regulatory requirements and include service standards that would typically be expected of water utilities such as the availability of water supply, water quality, customer complaints and system failures. Essential Water could consider adding service standards around value-for-money and safety to better align with its business objectives. The IWCMS identified gaps in LoS regarding performance data collection for notifying customers of planned works and implemented procedures to measure water and sewerage response times. This gap was identified in the previous review by Aither in 2019 and there is limited evidence to suggest that these gaps have been resolved. Essential Water engaged Woolcott Research in April 2019 to undertake a customer survey and use the research findings to inform the service standards proposed in the current submission. The engagement was undertaken in response to recommendations made by Aither in the 2019 review to conduct customer consultations ahead of this determination period. There is no evidence to suggest that Essential Water conducts service level reviews, that are informed by customer consultation, on a routine basis.
Risk Management	Essential Water follows Essential Energy's Corporate Risk Management Policy, which has not been reviewed. The WAMP outlines that the policy adopts the approach described in AS/NZS 4360:2004 Risk Management and that risk is measured considering probability and consequence of failure.

Category	Review
	The WAMP states that the Risk Management Policy is used to determine the criticality of asset classes, as well as capital and operational strategies. The risk assessment included in the IWCMS shows a consistent manner of assessing risks where the hazardous even, potential risk, preventative measures, monitoring and residual risk are defined for each risk assessed. This risk assessment was last updated in 2019. The previous review conducted by Aither in 2019 found that the application of risk principles in decision making on projects was deficient. Aither found that there was no clear application of the framework or quantitative risk assessment for critical projects review. Figure 13 shows that reactive maintenance represents a significant portion (approximately half) of all maintenance activity carried out by Essential Water. This suggests that Essential Water is not using predictive risk management principles to manage its assets in line with industry best practice, which could be leading to cost inefficiencies and unnecessary additional risk for Essential Water. A key asset-related risk that Essential Water must manage is changes in demand for water and sewerage services. Demand related risks are identified, monitored and managed through demand planning / forecasting and demand management strategies. The previous review conducted by Aither in 2019 found that Essential Water had no explicit long-term supply demand planning, which was considered reasonable noting there was no forecast increase in demand for water in the short or long-term. The IWCMS now provides evidence of long-term planning and is consistent with Aither's prior finding that there is sufficient capacity to meet demand in the near term. The following strategic documents were reviewed: • The IWCMS, which was developed in 2021 and includes demand projections for a 30-year period. These projections consider historical population, water production, water consumption, and demand drivers like visitor population, annual events, industry development, climate and community growth. There is limited evidence of risk assessment or sensitivity testing for the demand projections. Demand projections includes a 3ML/day allowance for the Cobalt Blue Mine, which is currently operating as a pilot plant; however Essential Water has excluded this in the forecasts for their current submission due to uncertainty around if and when the mine will commence its operation. Essential Water is instead proposing to address potential demand increases through a demand volatility adjustment mechanism. Th IWCMS assess the capacity of water infrastructure against the demand projections. • The Strategic Plan, which was last updated in 2018 and provides Essential Water's strategic investments planned for the FY17-23 period. It is presumed that the Strategic Plan (including demand forecasting and capital works) has not been updated to reflect current demand projections from the IWCMS. We recommend that Essential Water review and update key planning documents as more current information becomes available. • The WAMP was last reviewed in 2021 and summarises Essential Water's approach to demand management and the types of demand management strategies used.
Investment Planning	Essential Water's approach to investment and works planning is outlined in the WAMP and is governed by a capital governance process which was reviewed by Aither for the previous determination period. At a high level these include: • **Lifecycle planning:** The WAMP states that Essential Water adopts a lifecycle approach to asset management which considers the trade-off between cost of asset replacement and cost of maintaining existing assets. However, there is little evidence that Essential Water applies a lifecycle approach to works planning as the WAMP states that the risk and consequences of potential asset failure is often the main driver for asset renewal. The WAMP and Strategic Plan do not document lifecycle analysis undertaken, asset deterioration curves used in lifecycle modelling and/or specific lifecycle considerations made in planning works. • **Asset renewal planning:** The WAMP outlines Essential Water's asset renewal approach where the timing of asset renewals is based on asset life, asset condition, historical expenditure, and risk to service levels. This generally aligns with the approach taken by other water utilities and government organisations; however, there is no detail on how Essential Water plans the timing asset renewals when asset condition data is not available. Specific renewal strategies for various asset classes are summarised in the WAMP, however there is little documentation of the analysis used to develop these strategies. • **Asset disposal:** Asset disposal may be required to mitigate risk to service level or make room for new or renewed assets. The asset strategy in the WAMP outlines asset disposal as a key consideration along with non-asset solutions, strategic capital investment and maintenance planning; however, there is no evidence of asset disposal considerations in the WAMP. • **Business case and options analysis:** Essential Water requires a business case for major capital works (greater than $100,000). A structured process is defined in the WAMP and requires cost-benefit analysis, options development, economic and financial appraisal, and risk assessment / sensitivity testing. There is evidence that individual cases address most of these requirements, however there is a lack of quantitative risk assessment /sensitivity testing. This finding is consistent with Aither's 2019 review for the previous determination period. The business cases and Strategic Plan do not document how the options are identified to determine if all potential sources of information have been considered. • **Project prioritisation:** The WAMP states that projects are prioritised based on safety, environmental, compliance reputation, operational and financial factors, which generally aligns with Essential Water's asset management objectives. It is unclear if these factors are weighted differently (to reflect the relative importance), and the scoring system / priority matrix used. There is limited evidence of the application of project prioritisation. For example, the Strategic Plan does not specify the priority of the major capital works planned.

Category	Review
	Generally, Essential Water has defined its approach and processes for works planning, however there is limited documentation of the application of these processes to major capital works. Without appropriate documentation, there is a risk that analysis, assessment and evaluation undertaken is not consistent or aligned with Essential Water's defined approach. This finding aligns with Aither's findings in the 2019 review.
Cost forecasting and budget determination	Essential Energy's financial statement for the year ended June 2021 indicates that a comprehensive valuation occurs every three years and was last undertaken on 30 June 2020. However, the IWCMS (last updated in 2021) notes that the last asset revaluation was undertaken by GHD in 2009. This presents conflicting information which may pose a risk that Essential Water's cost forecasting and budget determination processes used outdated information that does not reflect the current asset base. Furthermore, the IWCMS notes significant changes to Essential Water's assets such as $14.4 million investment by Essential Energy into water network capital programs.
Delivering asset management activity	In this current submission, Essential Water is proposing to shift its capital expenditure delivery program, where major capital works are outsourced, and smaller projects and daily operations are run internally. Appropriate processes and mechanisms are required to manage the efficient delivery of asset management activity. Essential Water's current processes include: • **Procurement:** See Section 4.3. • **Project management:** Essential Water's approach to project management and monitoring is described in the WAMP and is intended to enable review of project issues and allow corrective action to be taken. For example, Essential Water requires that project managers complete a project review and post implementation review for all projects greater than $20,000. There is insufficient evidence to determine if these reviews are undertaken consistently and review findings are applied are 'lessons learnt' to subsequent projects. • **Operational control mechanisms and monitoring:** Essential Water manages and monitors maintenance activities through the Mainpac work order management system. The WAMP describes Essential Water's approach to maintenance as a mix of preventative measures and condition monitoring, acknowledging that reactive maintenance is not sustainable in the long-term and leads to poor customer service. Analysis of work order history (see Figure 13) shows that this approach is not well implemented with reactive maintenance representing approximately half of all maintenance works carried out by Essential Water. The WAMP notes that most inspections are unplanned tasks. Essential Water should have a planned inspection regime that considers regulatory requirements, asset criticality, and projected risk of asset failure. Other operational control and monitoring procedures, such as raw quality monitoring, pollution emergency response, and emergency management, have not been reviewed. Overall, Essential Water has established approaches and mechanisms to manage the delivery of asset management activity; however further work is needed. This includes documenting application of project management reviews, planned and targeted inspection regimes and closing the gap in recording and measuring of response times to asset failure or service interruption.

Enabling asset management	Appropriate mechanisms and resources are required to enable effective asset management to be undertaken to achieve asset management objectives. The following enabling mechanisms have been reviewed:
	• **Asset knowledge and data:** Asset condition data informs asset renewal planning and has a significant role in validating expected works and identifying unplanned works. The WAMP states Essential Water plans condition assessments considering the cost of condition monitoring, the consequences of not preventing asset failure and analysis of equipment performance. While this approach seems reasonable, further detail is required to ensure that this approach is applied consistently by staff and aligns with an appropriate level of risk. Furthermore, the WAMP states that a properly planned maintenance program should have very few unscheduled maintenance events, however the WAMP notes that most inspections recorded are unplanned. There is insufficient detail to determine the currency of asset condition data, and if inspections are planned in line with approach discussed.
	• **Asset management information systems and procedures:** Essential Water uses multiple asset data management systems including:
	  • Integrated asset management and geographical information system that records condition data, tracks asset inspections and maintenance (described in WAMP)
	  • Reliability performance capture system
	  • Maintenance management system (Mainpac) that records all maintenance activities and monitor unit replacement costs
	  • New risk optimisation tool (Copperleaf C55) that was introduced as part of the Corporate Transformation Program to manage capital works planning
	  • New enterprise asset management system that is proposed as part of the Corporate Transformation Program.
	This indicates that Essential Water's asset management decision making is informed by multiple data sources; but there is little evidence of documented data management processes, which presents a risk to data consistency, quality and accuracy. We recommend that Essential Water define and document the data quality principles and data collection methods it uses, the staff responsibilities for asset data, and the interactions between different asset data systems. Essential Water should also review its asset data systems on a routine basis to confirm that the systems are achieving the desired benefits.

Category	Review
	• **Resourcing:** In August 2019, Essential Energy was issued with a Ministerial Direction which prevented Essential Water (as a subsidiary of Essential Energy) from making voluntary or forced redundancies. This redundancy restriction has now expired, however Essential Energy has committed to 'no redundancies in Western NSW for the remainder of the 2019-24 Determination Period'. Essential Water's Strategic Plan details its Human Resources Plan for the FY18-23 period, which identifies four positions as redundant through natural attrition. The Strategic Plan states that Essential Water was intending to not fill these positions if they became vacant; however, these reductions have been offset by subsequent hires where internal resources were unable to meet requirements. For example, Broockman was contracted in an asset management role. • **Staff competency, training and asset management awareness:** There is some evidence to suggest that Essential Water undertakes training to maintain staff competency. For example, the WAMP mentions a training policy and approach (not reviewed) and Essential Water recently rolled out training programs for technology enabled contract management, as part of the Corporate Transformation Program. However, gaps have been identified which require further work. Essential Water notes that restrictions around staff redundancies and an aging workforce have led to reduced appetite for training and upskilling, and there is a lack of definition around the competencies required to undertake roles and responsibilities within Essential Water. In addition, there is limited evidence to determine staff awareness of asset management practices.
Performance review and continuous improvement	There is evidence that Essential Water is taking actions to continuously improve its asset management practices. For example: • Collation of asset management document into WAMP was a key strategic objective. • The WAMP states that Essential Water is continuing to implement integrated asset management and geographical information system, although there is no further evidence to support this statement. • A Corporate Transformation Program is underway through Essential Energy, which includes key asset management related initiatives such as Copperleaf C55 (risk optimisation tool for capital expenditure management) and workforce planning framework. The WAMP states that Essential Water approaches continuous improvement in line with ISO9001 Quality Management Systems Standard; however, there is a lack of documentation regarding the Essential Water's methodology for identifying, assessing and prioritising improvement opportunities. Without sufficient documentation, there is a risk that asset management improvement initiatives implemented are not suitable for the size, capability and maturity of the water business. The WAMP summarises Essential Water's approach to corporate and capital governance, which includes internal audit function, operational excellence and project management office. Other auditing requirements include: • IPART conducts annual operational audit to assess Essential Water's compliance with the 2013 Australian Drinking Water Guidelines. • Essential Water's annual water management performance reports are independently audited every 3 years. • Part of the IWCMS development included audit of Essential Water's performance against work health and safety, as part of Essential Energy's safety certification requirements. Results of the audit were not provided in the IWCMS, however the strategy noted several safety issues for sewer assets identified in a 2009 condition assessment conducted by GHD. It is unclear if these issues were resolved.
Performance in comparison to peers	In our experience with the asset management systems and processes of water utilities and other businesses, most organisations align to some level with the asset management standard, however not many are certified against the standard. In that respect, Essential Water's asset management maturity is reasonably consistent with other similar businesses in that it demonstrates clear commitment to good asset management practice and continuous improvement, however there are improvements that can be made to further advance maturity. Certification to the standard for a small rural business such as Essential Water may not be required to deliver efficient asset management practice.

4.3 Procurement

Procurement is the process of acquiring goods and services and begins when a need has been identified and a decision has been made on the procurement requirement. Procurement continues through the processes of risk assessment, seeking and evaluating alternative solutions, and the awarding and reporting of a contract.

Essential Water adopts Essential Energy's Company Procurement Policy CECP0009.04 that was last updated in August 2020. The purpose of the procurement policy is to establish a common approach and encourage continual improvement of procurement activity through actions including, but not limited to driving value for money and sustainable benefits and embedding effective risk and compliance controls.

The policy states that it aligns with Essential Energy's vision, purpose and values, and affirms the company's commitment to best practice governance and integrity for procurement. Essential Water's procurement principles are summarised in the Framework in Figure 7.

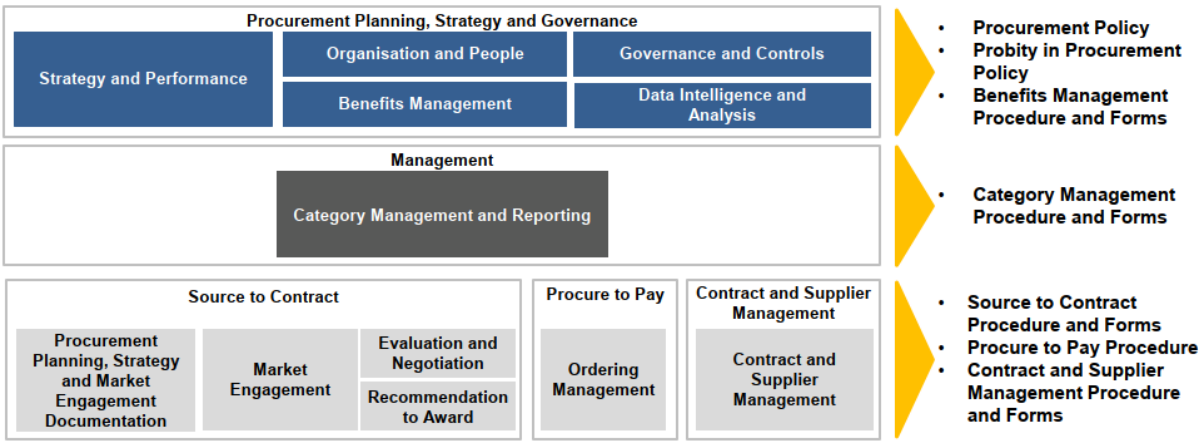

Figure 7 Essential Water's Procurement Framework

As a State-Owned Corporation, Essential Water's tendering, contracting and purchasing procedures and practices are required to be generally consistent and in line with NSW Government guidelines, and reflect high standards of ethical conduct. As such, we have reviewed Essential Water's procurement practices against the procurement objectives established in the NSW Government Procurement Policy Framework. The findings of our review are presented in Table 12.

Table 12 Review against procurement objectives

Procurement Objectives	Description	Review
Value for money	Value for money requires a balanced assessment of range of financial and non-financial factors.	The policy generally aligns with this objective, defining value for money in relation to advancing the company priorities, fit for purpose, quality, service and support, and whole of life costs (including transition and transaction costs). It is unclear if Essential Water uses a value for money criteria when assessing tender proposals.
Fair and open competition	Transparent, competitive processes that builds trust in procurement practices and decisions, drives fair and ethical behaviour, safeguards probity and fosters health working relationships between buyers and suppliers.	The policy generally aligns with this objective. The policy defines 'fostering fair and open competition into procurement activity' as a procurement value. Essential Energy maintains a Tenders and Suppliers section in its website to support existing and prospective suppliers. Information publicly available on the website include: • Guides, manuals and demonstration videos to assist suppliers using Essential Energy's Oracle Fusion applications • Statement of Business Ethics • Standard and panel supplier terms and conditions • Modern Slavery Statement and awareness pack for suppliers • Code of Conduct.
Easy to do business	Streamlined and accessible procurement processes lower barriers to participation and expands opportunities to a broad supply base.	The policy generally aligns with this objective, defining 'easy to do business with' as a procurement value. This value is implemented in Essential Water's procurement practices through: • Essential Water's tendering processes are consolidated with Essential Energy. Essential Water's website refers suppliers onto Essential Energy's website. • Release of a new Enterprise Resource Planning system to introduce more efficient HR processes and procurement activity, as part of the Corporate Transformation Program. • New supplier portal on Essential Energy's website where prospective suppliers can register their details. Essential Energy uses this information when quotes or bids are requested. • Details of current and previous tenders are listed in the Tenders and Suppliers section of Essential Energy's website. • Essential Water's website refers suppliers onto Essential Energy's website.

Procurement Objectives	Description	Review
Innovation	Industry engagement and flexible procurement practices assists adoption of innovative services and solutions, including in supply chains.	The policy defines 'encourage innovation and focus on the future' as a procurement value; however, it is unclear how this is implemented in Essential Water's procurement processes.
Economic development, social outcomes and sustainability	Procurement to support small / medium sized businesses, regional businesses, disability employment organisations and social enterprises. Sustainable procurement focuses on delivering value for money on a whole of life basis.	An objective of the policy is '*encouraging the use of regional, rural, and remote resources, small and medium sized businesses, and disability employment organisations*.' However, this contradicts the procurement value defined in the policy of '*fostering a culture of respect, community care, inclusivity, fair and open competition into procurement activity such that opportunity is provided to all organisations who are able to provide the goods and / or services we need regardless of the organisation's size, location, social and cultural factors'*. It is unclear if Essential Water considers locality and size of the supplier's workforce in the tender assessment process. Essential Energy has published a Modern Slavery Statement and awareness pack for suppliers. Suppliers are required to complete a modern slavery survey when registering to become a supplier and complete more in-depth surveys as requested.

The Procurement Policy is a very high-level document that is supported by several company procedures and policies outlined below. We have not been provided with many of these documents, audit results that may have been conducted and/or other procurement documentation to determine if Essential Energy's procurement policy and approach is actively implemented by Essential Water. Procurement is reviewed in further detail for specific capital projects in Section 7.

Publicly available and reviewed	• Company Procedure – Essential Energy Code of Conduct – CECG3000.01 • Company Procedure – Statement of Business Ethics – CEOP1115 • Company Procedure – Modern Slavery Statement
Not available or reviewed	• Board Policy – Delegation of Powers and Functions to the Chief Executive Officer and Power of Attorney – CECP0001.01 • Board Policy – Governance – CECP0002 • Board Policy – Risk Management –CECP0002.03 • Company Policy – Sub-Delegations of Authority by the Chief Executive Officer – CECP0001.02 • Company Procedure – Source to Contract – CEOP0009.06 • Company Procedure – Benefits Management – CEOP0009.07 • Company Procedure – Category Management and Reporting – CEOP0009.08 • Company Procedure – Contract and Supplier Management – CEOP0009.09 • Company Procedure – Gifts, Benefits, and Invitations – CEOP3000.14 • Company Procedure – Conflict of Interest – CEOP3000.17

4.4 Decision Making Over Source of Water

Essential Water has provided the following insights into its decision-making process to source water:

> *The decision making for sourcing water has become very straightforward since the introduction of the Broken Hill Pipeline. This is the default setting unless there is a requirement for use of Stephens Creek as the emergency reservoir.*
>
> *Clause 8.2 in the pricing submission explains the rationale behind Essential Water's decision to source the majority of its bulk water from the Murray Pipeline.*
>
> - *Stephens Creek Reservoir is effectively dry 60% of the time. Water was pumped into Stephens Creek Reservoir in 2019 to ensure emergency levels were maintained*
> - *Chemical dosage is significantly higher due to the poorer water quality at Stephens Creek Reservoir*

- *Electricity consumption is greater when water is pumped from Stephens Creek Reservoir. (Whereas a 500KW Solar Bank is located the Broken Hill Bulk Supply Pump Station).*
- *Changing water sources creates additional tasks for the Water Treatment Operators. An extensive testing and dosing process is carried out to ensure the plant is reconfigured to treat the different water source.*
- *Essential Water is obligated to use (pay for) 8ML per day for the Murray pipeline.*

In simple terms even when water is available in Stephens Creek Reservoir, there are no financial benefits to using this water, as water quality from the Murray Pipeline is higher, changing water sources adds an element of risk in the treatment process, and we are needing to pay for a minimum usage from the Pipeline anyway. Stephens Creek Reservoir will remain as a vital emergency water supply for Broken Hill.

Given the minimum contracted offtake of water from the pipeline, and the improved outcomes of sourcing water from the pipeline, Essential Water's decision-making process is prudent. It notes that the Stephens Creek Reservoir acts as vital emergency water supply for Broken Hill, however, given the reservoir is dry 60% of the time, this does not appear to be an effective back-up supply. Development of a water storage strategy is included in Essential Water's forward operating costs (as a hire services provision) to evaluate the ongoing viability and future use of the Stephens Creek reservoir. We consider this a prudent investment to evaluate the future need for the reservoir, and the strategy should consider the ongoing costs in comparison to the benefits provided.

4.5 Climate Change Planning

Essential Water considers climate change in its planning processes through supply side augmentations or projects, as well as demand management strategies.

The IWCMS provides water demand analysis and projections for a 30-year period and assesses the capacity of current infrastructure against these projections. The water production model uses water production data and customer billing data as inputs, and modelled demand is hind cast over 45 years of historical climate data to capture expected demands during actual dry years. The IWCMS refers to climate variability data from CSIRO (report on Climate Change in the Western Catchment 2007) and the Canadian Climate Centre (Canada T47 dataset), which is used to forecast customer demand under a climate change scenario.

The IWCMS states that water demand projections are used to identify required augmentations and determine the staging of these projects. Water production models Essential Water uses augmentation and extension projects to:

- Increase capacity to meet assessed demand
- Improve quality, security and reliability of supply
- Improve flexibility of water operations.

There is little evidence of how findings from the IWCMS have been applied to Essential Water's planning processes as the Strategic Plan, which documents the major capital projects for the FY18-23 period, has not been updated to reflect this new information.

Essential Water also considers climate change in its planning processes through demand management. The WAMP states that demand management investigations are integrated into Essential Water's water planning and investment decision processes and can be used to defer the need for network augmentations or extension projects. This approach includes comparison of asset construction options to demand management options considering time value for money, income and expense streams.

There is evidence of demand management strategies, namely the Drought Management Plan which was last reviewed in 2021. The plan is comprehensive and describes:

- Water infrastructure asset inventory (storage, transfer, treatment and reticulation assets, and their capacities).
- Historical water consumption and drought history.
- Drought management action plan with eight levels of implementation (including triggers, objectives actions, responsibilities, cost and targets).

- Drought review and monitoring processes.
- Drought management team, roles and responsibilities and communication requirements.

There is evidence of application of demand management strategies, for example Essential Water placed water restriction in Broken Hill, Menindee, Sunset Strip and Silverton which were lifted in March 2021.

4.6 Asset Lives

Essential Water has proposed the asset lives for new assets in Table 13. These asset lives are largely consistent with those allowed for in the 2019 Determination, except for ICT assets. In the 2019 Determination, a life of four years was proposed for ICT assets. Aither's review of this found that this was a conservative estimate that would likely place upward pressure on customer prices. Aither instead suggested adopting a 10-year life for ICT assets, which is consistent with IPART's decisions on Sydney Water's asset lives, on the basis that 10 years represented a weighted average of ICT asset lives.

Essential Water has since contended that for Essential Energy, the Australian Energy Regulator approved a life of five years for ICT assets. Essential Energy also noted that the Australian Tax Office (ATO) effective lives for computers and related equipment is generally around 4 to 5 years[4]. While we agree that 5 years may be reasonable for small hardware such as computers, the ICT asset class in question includes larger, longer-lived assets (enterprise software systems). In practice, the business model for acquired software is now usually based on rental (per user or per seat) as opposed to purchase and replacement. For in-house developed enterprise software systems we would expect a life of longer than 5 years.

We agree with the previous finding that five years is a conservative estimate and recommend that 10 years be adopted for ICT assets, consistent with the previous determination for Essential Water, as well as the two most recent determinations for Sydney Water.

For the other asset classes, these are consistent with the previous determination, and we do not recommend any changes to these. Our recommended asset lives are also presented in the table.

Table 13 Asset Lives – Essential Water Proposed

Assets	Proposed Asset Life for New Assets (years)	AECOM Recommended
ICT	5	10
FFP&E	7	7
Vehicles	15	15
Buildings	50	50
Water	98	98
Sewerage	89	89

We noted in Section 4.2, however, that we have not seen evidence that Essential Water uses lifecycle management principles and practices in its maintenance planning, and the fact that its reactive maintenance is a high proportion of all its maintenance activity (approximately 50%, as indicated in Figure 13) suggests that there is room for improvement in this area.

As a rule of thumb, good practice maintenance would result in reactive maintenance at less than 20% of all maintenance activity and is achieved by using predictive maintenance principles based on good knowledge of the lifecycle of the assets. Reactive maintenance is generally more costly than preventative, and results in a higher level of service interruptions than would be the case otherwise.

Improved performance in this area is generally achieved by adopting a predictive maintenance regime, which involves using and updating expectations of asset deterioration during service on a lifecycle basis, to enable

[4] ATO (2021). TR 2021/3 Income Tax – effective live of depreciating assets, applicable from 1 July 2021. https://www.ato.gov.au/law/view/view.htm?docid=%22TXR%2FTR20213%2FNAT%2FATO%2F00001%22

more reliable assessment of the risk of asset failure through that service life and improved prediction of remaining service life (for asset renewal and investment planning).

Essential Water has demonstrated steps towards a more predictive maintenance regime:

- Investment in the Mainpac upgrade, which will assist Essential Water more accurately predict which assets are at end of life and require intervention.
- Staff training to develop and implement a long-term strategy for maintenance.

Planned capital works (including upgrades and replacements to the water and sewer reticulation, Graziers pipeline, Menindee WTP and Wills Street WWTP) which are expected to reduce reactive maintenance requirements. We expect that this will enable it to realise efficiency gains in the future.

5. Review of Cost Allocation Methodology

Cost allocation involves the attribution and allocation of overhead costs to identified services, segments and components. Most regulatory guidelines suggest that cost should be allocated at the most granular level possible.

5.1 Summary of Key Findings

Based on our review, a summary of findings is as follows:

- We find that the cost allocation methodology proposed is reasonable and consistent with cost allocation methodologies of comparable businesses. For the 2022 Determination Period, Essential Water has further proposed reductions to increase the efficiency of the corporate overhead allocation by applying discounts to those costs which do not directly apply to water.
- Essential Water has artificially reduced the corporate overhead costs to achieve an acceptable allocation target of around 17% by taking 50% of allocated cost items exceeding $0.2 million. While this is favourable in achieving reduced costs, Essential Water has indicated that this is unlikely to continue beyond the determination period, which presents a risk that costs will rise in future periods.
- For the 2019 Determination Period, we consider that the discounts applied to allocated costs for the forward period are relevant to those corporate overhead costs in FY22, and therefore have recommended that these be applied to this year also. We recommend that this reduction should be 37% of the allocated costs (the average adjustment proposed by Essential Water over the 2022 Determination Period). This reduces the allocated corporate overhead (shared costs) costs in FY22 from $9.2 million to $5.8 million through adjustments of $1.1 million in corporate overheads allocated to direct operational costs and of $2.2 million in corporate overheads allocated to direct costs incurred by capital projects.
- For the 2022 Determination Period, we consider that the corporate overheads are reasonable. We have recommended efficiency adjustments to direct operating and capital costs as outlined in the following sections, and as a result the allocation of overheads is expected to change slightly due to changes in the allocator implied by the adjustments recommended to direct costs.

5.2 Principles of Cost Allocation

Based on research into cost allocation principles, there are several notable principles which are common to many regulated entities' methods of allocating overhead costs:

- Wherever possible, costs should be directly identified and attributed to a service, segment or component.
- Causality is the most prominent principle in cost allocation guidelines and manuals. Costs are attributed or allocated to those activities and services that cause the cost to be incurred. This means that where a cost is unable to be directly identified or attributed, then that cost should be allocated to a service, segment or component based on a causal driver of that cost.
- In the absence of a causal relationship, a reasonable method of allocation should be used as a substitute for an ideal causal allocator.
- All costs should only be allocated once.

These principles have formed the basis of review of Essential Water's cost allocation methodology.

5.3 Essential Water's Cost Allocation Methodology and Principles

Essential Water has costs allocated in accordance with the *Essential Energy Cost Allocation Method – May 2017 (CAM)*. The CAM outlines the following principles of cost allocation:

- *Costs are directly attributed to, or allocated between, categories of distribution services, based on the substance of the underlying transaction or event, rather than its legal form.*
- *The same costs are not allocated more than once.*
- *Costs will not be reallocated between service lines during a regulatory control period.*
- *Direct costs can only be attributed once to a single category of distribution services and shared costs are only allocated once between categories of distribution services.*

- *Shared costs are collated into a pool and allocated across standard control services, alternative control services, unclassified distribution services and unregulated business activities.*
- *Detailed principles, policies and the approach used to attribute costs directly to categories of distribution services are consistent with the Ring-Fencing Guideline. That is, that only costs associated with distribution services are attributed or allocated to distribution services and using the principles set out in this CAM.*

The principles of cost allocation applied in the CAM generally align with core principles noted above. While not directly referred to in the principles, the CAM clearly states that allocation occurs when direct costs are unable to be attributed, which aligns with the first principle of cost allocation mentioned in Section 4.3.1.

5.3.1 Allocating Shared Costs (overhead)

Essential Energy puts all project and function costs that cannot be directly attributed to a service category into a shared cost pool to be allocated across the service categories. Shared costs include:

- Regulation
- CEO Office
- Human Resources and Industrial Relations
- Finance
- Operational Health and Safety.

Shared costs are allocated using a direct cost allocator. Allocation via a direct cost allocation is a commonly used method of allocation for regulated entities, including Sydney Water, Energex etc.

Application of a total direct cost allocator to all shared costs may not be fully reflective of the ideal causal allocator, for example human resources costs, where an allocator of full time equivalent (FTE) or labour hours may be more suitable, given the number of people in each service line may drive where the human resources efforts are being directed. In addition, including capital expenditure in the total direct cost allocation approach may not be the most appropriate allocation approach, given some capital costs (such as materials and contractor costs) may not be causal drivers for corporate overheads.

However, we understand that consistent application of an allocator for shared costs simplifies the allocation process, and the efforts and costs required to calculate and apply alternative allocators may outweigh the benefits. In addition, the CAM is accepted by the Australian Energy Regulator (AER), and is consistent with energy organisations' allocation methodologies.

5.3.2 Essential Water's Adjustments

The Proposal notes that Essential Energy has introduced several transformation initiatives at the corporate level that in the long run are designed to help reduce corporate costs. This program is expected to cost approximately $250 million, according to the Essential Water Pricing Proposal. It is unclear from the Proposal the expected quantified benefits of the Program, however in Essential Energy's previous Pricing Submission to the AER, benefits were expected to be in the order of $273 million, with expected spend of $130 million[5] (in $FY19).

In the short term, this has resulted in increased corporate costs, which would increase the total amount allocated to Essential Water if the CAM was directly applied. To reduce this impact for the 2022 Determination Period, Essential Water has outlined in its proposal that it does not propose to recover the full corporate overhead costs allocated by the CAM. Alternatively, it has applied the following methodology to assist the corporate overhead allocation better reflect causal drivers:

- Start with the value from direct application of the CAM.
- Remove any costs associated with transformation departments that don't directly apply to water.
- Apply a 50% reduction factor to any individual items allocated to Essential Water valued at over $200,000.

Essential Water states that this approach has resulted in operating expenditure of $4.6 million less than what would be included if the CAM had been directly applied with no adjustments (Table 14).

[5] Essential Energy (2019). *2019-24 Revised Regulatory Proposal. https://www.aer.gov.au/system/files/Essential%20Energy%20-%20Revised%20Proposal%20-%20December%202018.pdf*

Table 14 Essential Water's Proposed Corporate Overhead Costs ($ Million, $FY22)

	FY23	FY24	FY25	FY26	FY27	Total
Operating expenditure						
Direct application of the CAM	$3.01	$2.82	$3.17	$3.21	$3.07	**$15.27**
Proposed corporate overheads	$2.42	$2.23	$2.14	$2.02	$1.86	**$10.68**
Proposed variation	-$0.58	-$0.58	-$1.03	-$1.19	-$1.21	**-$4.59**
Capital expenditure						
Direct application of the CAM	$5.52	$5.86	$3.81	$1.21	$1.14	**$17.52**
Proposed corporate overheads	$2.98	$3.16	$2.22	$0.81	$0.75	**$9.92**
Proposed variation	-$2.54	-$2.69	-$1.58	-$0.40	-$0.39	**-$7.60**

5.3.3 Findings

Essential Water's cost allocation is performed in accordance with a CAM approved by the AER for Essential Energy and uses a total direct cost allocator to allocate shared costs. We consider that while this may not be the most appropriate causal allocator for corporate overheads for Essential Water, the approach has been reviewed and approved by the AER for Essential Energy. Further, Essential Water has made additional adjustments to the allocation method, which would make it difficult to understand the impacts of a change in allocation methodology.

The approach taken by Essential Water to reduce its allocation to corporate overheads appears reasonable in that it has removed from the pool those corporate costs that may not be relevant to the water business. Essential Water has advised that the other adjustment, the additional 50% reduction on items over $0.2 million, is a relatively arbitrary adjustment has been applied to achieve a reasonable allocation target of below 20%. This target appears to be based on a review undertaken by SKM in 2014[6], which recommended a target of 18% based on benchmarking which indicated that corporate costs as a percentage of direct operating expenditure typically range from:

- 17% to 25% for comparable (rural) stand-alone water businesses,
- 9% to 13% for numerous larger water authorities (which are smaller than Essential Energy as a whole).

Discussions with Essential Water suggest that the proposed 50% reduction on allocated cost items over $0.2 million is an arbitrary and temporary adjustment designed to achieve a specific allocation target. It has stated that it does not expect the adjustment to continue into future determination periods as Essential Water and Essential Energy make further efforts to better attribute direct costs. The information provided does not allow us to determine the impact of this adjustment, however there may be a risk that corporate overheads increase in future periods if this adjustment is removed.

5.4 Corporate Overheads

Figure 8 presents the corporate overhead costs over the 2019 and 2022 Determination Periods. The allocated costs are represented by the shaded green columns, and the adjustments proposed by Essential Water by the grey. The value of the receiving pool of capital and operating expenditure is denoted by the blue markers.

[6] SKM (2014). *Strategic Management Overview and Review of Operating and Capital Expenditure for Essential Energy's water and sewerage business in Broken Hill – Final Report.*

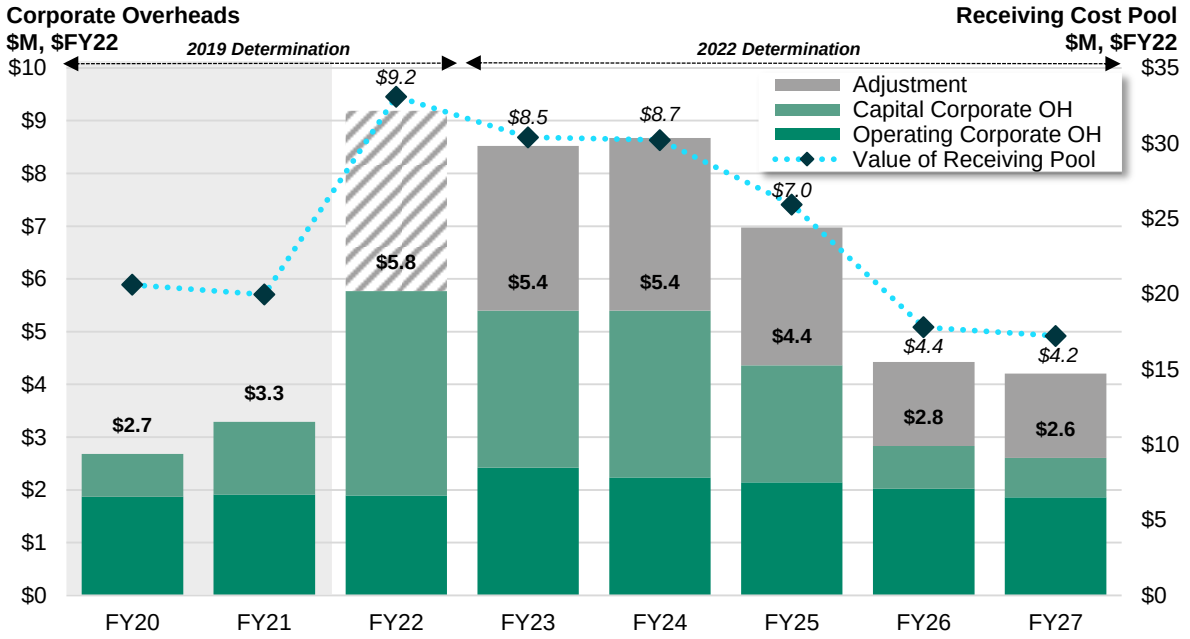

Figure 8 Essential Water's Corporate Overhead Costs ($ Million, $FY22)

As demonstrated in Figure 8, FY22 corporate overheads are projected to be significantly higher than the IPART allowance, as well as higher than in previous years. We understand this to be due to a combination of higher receiving pool (particularly through higher capital costs) in this year (thus attracting a higher allocation of overhead), and the total overhead pool being larger as a result of the Transformation Program. While the value of the receiving cost pool in this year is higher than previous, the rate of change in the allocated corporate overhead costs is much higher (179% as compared to 66%).

Looking forward to the 2022 Determination Period, the receiving pool for FY23 and FY24 is only slightly lower than that of FY22, but corporate overheads have decreased significantly. This is due to the adjustments recommended for the forward period (with the projected reductions as a result of these shown in grey). We consider that the adjustments made for the forward period are reasonable and help to ensure that Essential Water is not attracting costs for the transformation program that will provide no benefit to it. The same principle was not applied to FY22 corporate overheads, so we find are these not efficient, and a similar adjustment should be made to that year to reflect an efficient allocation.

We calculate that this reduction would be 37% of the allocated costs (the average annual adjustment proposed by Essential Water over the 2022 Determination Period). This would reduce the allocated corporate overhead costs in FY22 from $9.2 million to $5.8 million, a reduction of $1.1 million in operating corporate overheads and $2.2 million in capital corporate overheads. This adjustment is reflected in Table 15, and we consider this a catch-up adjustment.

In relation to this adjustment, Essential Water has noted that operating and capital cost allowances were set by IPART in the 2019 Determination, that the adjustments applied to the 2022 Determination Period were agreed to by Essential Energy in the interest of customer affordability and contended that it is not appropriate to undertake ex-post adjustments over the 2019 Determination Period to reflect adjustments in future overheads. We maintain the view that there is a strong justification for the change, as evidenced by the adjustments agreed between Essential Energy and Essential Water over the forward period. We acknowledge however, that there may be issues around the practicality of applying such an adjustment to the previous determination period.

Table 15 Recommended Corporate Overhead Costs ($ Million, $FY22)

	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Essential Water Proposed								
Operating Corporate OH	$1.87	$1.91	$3.02	$2.42	$2.23	$2.14	$2.02	$1.86
Capital Corporate OH	$0.81	$1.37	$6.17	$2.98	$3.16	$2.22	$0.81	$0.75
Total	**$2.68**	**$3.29**	**$9.19**	**$5.40**	**$5.40**	**$4.36**	**$2.83**	**$2.61**
AECOM Adjustment								
Operating Corporate OH	$0.00	$0.00	-$1.12	$0.00	$0.00	$0.00	$0.00	$0.00
Capital Corporate OH	$0.00	$0.00	-$2.29	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$0.00**	**$0.00**	**-$3.41**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
AECOM Recommended Costs *(Excluding Further Adjustments Required as a Result of Changes in Direct Costs)*								
Operating Corporate OH	$1.87	$1.91	$1.90	$2.42	$2.23	$2.14	$2.02	$1.86
Capital Corporate OH	$0.81	$1.37	$3.88	$2.98	$3.16	$2.22	$0.81	$0.75
Total	**$2.68**	**$3.29**	**$5.77**	**$5.40**	**$5.40**	**$4.36**	**$2.83**	**$2.61**

Further adjustments (beyond those nominated in Table 15) have been included because of adjustments to efficient operating and capital expenditure. These are detailed in Sections 6 and 7 respectively.

Essential Water has contended that further adjustments to corporate overhead costs over the forward 2022 Determination Period made because of adjustments to efficient direct operating and capital expenditure would have no basis, as the somewhat arbitrary reductions have been applied to reduce corporate overhead costs to a level that Essential Water consider to be a reasonable (as shown at Table 14). However, we maintain the principle that changes to the direct cost pool should correspond with reductions to the corporate overhead allocated. We note that a component of the cost reductions applied by Essential Water is to account for costs not relevant to the water business.

6. Review of Operating Expenditure

In this section we review historical and projected operating costs.

6.1 Historical Operating Expenditure - 2019 Determination Period

AECOM's review of Essential Water's operating expenditure for the 2019 Determination Period is provided below.

6.1.1 Summary of Key Findings

- Many of Essential Water's operating cost categories showed lower spend than IPART's allowances over the 2019 Determination Period, except for labour, hire services, fleet and corporate overheads. These were the major drivers for Essential Water exceeding IPART allowances by 8% over the period.
- We have found costs to be largely efficient, with some exceptions noted.

Adjustments to Essential Water's proposed operating expenditure over the 2019 Determination Period are recommended for:

- A general efficiency adjustment to total operating costs of $0.1 million. This is recommended to offset the corresponding increase in labour costs attributed to the improved attribution of support costs to direct labour, which we consider should be a cost neutral exercise.
- Corporate overhead costs, including a reduction in FY22 corporate overheads where costs were significantly higher and inconsistent with other years when comparing the total overhead amounts to the receiving cost pool.

6.1.2 Comparison to IPART Allowances

Essential Water's operating expenditure from FY16 to FY22 is provided at Figure 9, with values expressed in $FY22. The coloured bars represent actual costs (up to FY21) with forecast costs for FY22. The light green markers represent the allowance made by IPART in the 2019 Determination.

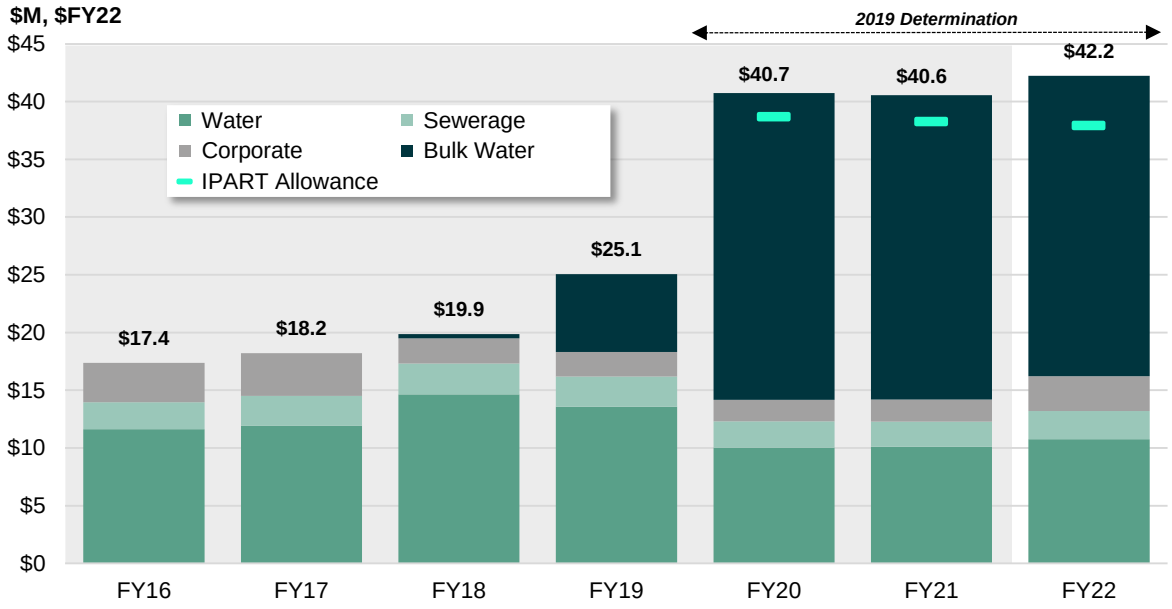

Figure 9 Essential Water Operating Expenditure FY16 to FY22 ($ Millions, $FY22)

As discussed in Section 1.5.2, Essential Water's operating expenditure exceeded IPART allowances over the 2019 Determination Period (on average, by 8%). Figure 10 presents a summary of average total costs over the 2019 Determination Period, in comparison to IPART allowances. The coloured columns represent Essential Water's average expenditure over the period, and the markers represent IPART's average allowance. The percentage difference for each cost category is reported.

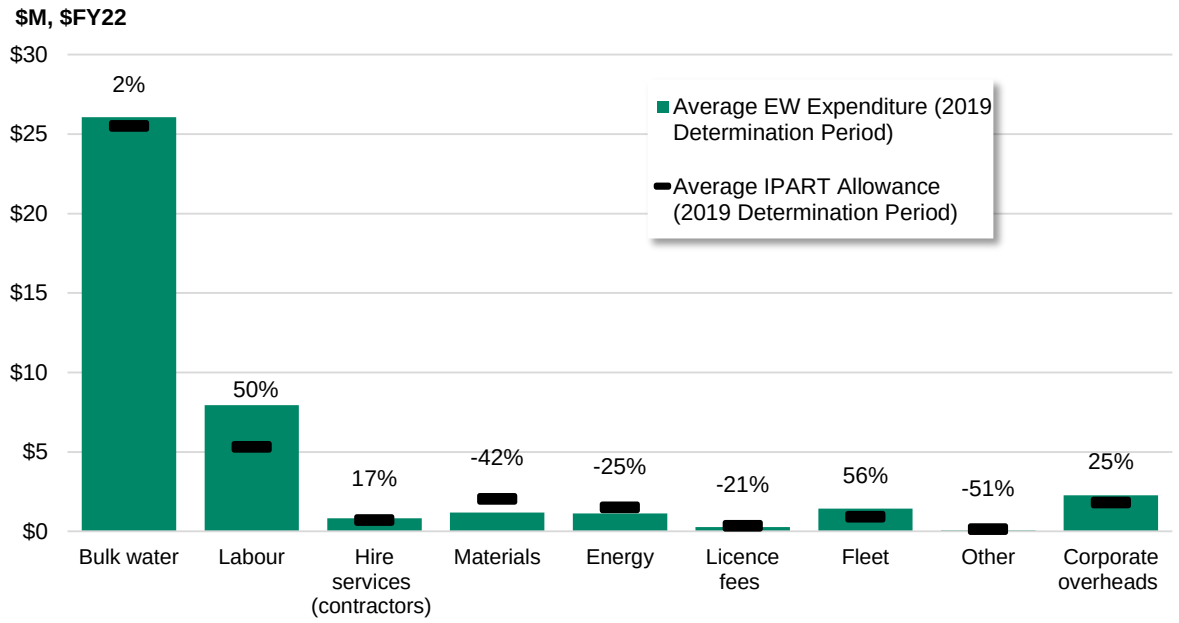

Figure 10 Average Operating Expenditure Compared to IPART Allowances, 2019 Determination Period ($ Millions, $FY22)

The main driver of the higher cost is labour, which was on average 50% (or $2.6 million) greater than the IPART allowance. Table 16 presents the tabulated summary. Hire Services also exceeded IPART allowances by 17%. Consequently, allocated costs such as corporate overheads and costs linked to labour, such as fleet costs were also higher than the allowance.

Table 16 Average Operating Expenditure Compared to IPART Allowances, 2019 Determination Period ($ Millions, $FY22)

	Average FY20 - FY22		
Operational Expenditure, $M, $FY22	**IPART Allowance**	**EW Expenditure**	**% Change**
Bulk water	$25.50	$26.05	2%
Labour	$5.30	$7.94	50%
Hire services (contractors)	$0.71	$0.83	17%
Materials	$2.04	$1.19	-42%
Energy	$1.50	$1.13	-25%
Licence fees	$0.34	$0.27	-21%
Fleet	$0.92	$1.44	56%
Other	$0.12	$0.06	-51%
Direct costs	**$36.44**	**$38.91**	**7%**
Corporate overheads	$1.81	$2.27	25%
Total	**$38.25**	**$41.18**	**8%**

The most significant variances to IPART allowances are discussed in the following sections.

6.1.3 Labour Costs

In its proposal, Essential Water has outlined its limited ability to achieve labour savings allowed for in the 2019 Determination. It provides the following explanations for these higher-than-expected operating costs over the 2019 Determination Period:

- The planned decommissioning of the Menindee Pipeline was expected to provide a reduction of four FTEs over the 2019 Determination Period. The decommissioning was delayed until 2022 due to the late commissioning of the replacement Graziers Pipeline, and so these efficiencies have not been realised.

- In 2019, Essential Energy was issued a Direction from the NSW Government preventing forced or voluntary redundancies for a period of 12 months in FY20. While the Direction has expired, Essential Water's proposal states that Essential Energy has introduced its own restriction to redundancies until FY24 (the end of Essential Energy's current regulatory period). Further, Essential Water notes that as a primary employer in Broken Hill, it has a social obligation not to introduce redundancies too quickly or significantly, given the ongoing impacts of COVID-19. The remote location of Broken Hill means that replacing lost skill sets may also be difficult.
- Increase incidences of main bursts have resulted in diversion of labour resources from capital expenditure to operational expenditure to address breaks and leaks. The proposal mentions 88 and 78 main bursts in 2019 and 2020 respectively, compared with less than 10 each in 2017 and 2018. There were higher incidences in the years preceding these, but not to the extent of the FY20 figures.

Figure 11 shows historical spend on labour over the 2019 Determination Period. Costs up to FY21 are escalated actual costs (as represented by grey shaded background), with FY22 being a projected cost.

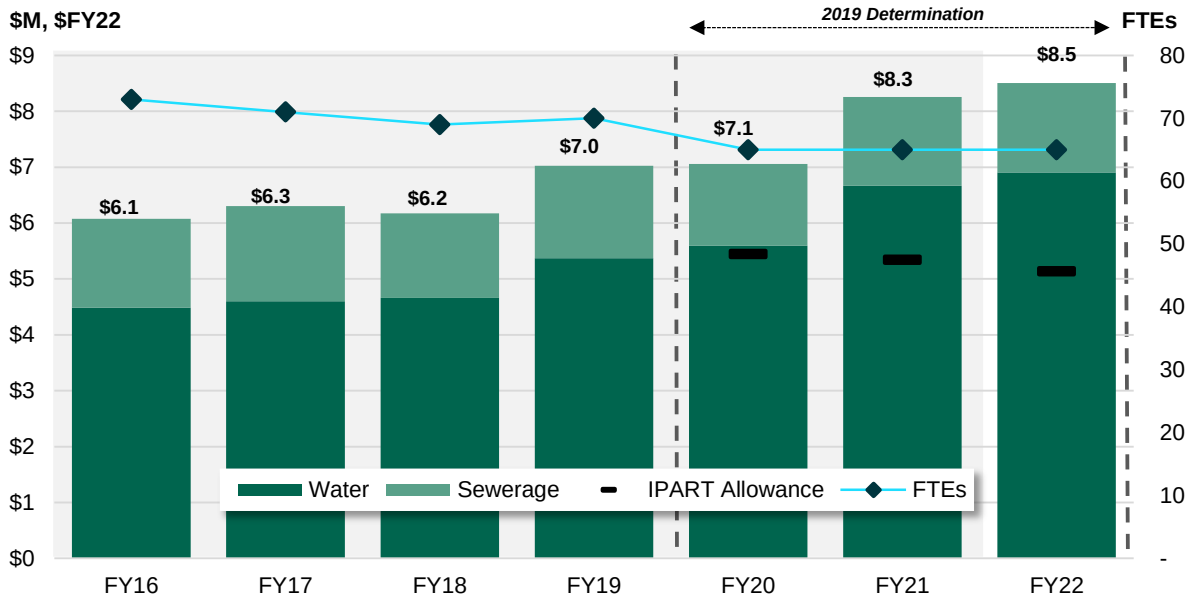

Figure 11 Operating Expenditure, Labour ($ Millions, $FY22)

The figure demonstrates a significant step up in labour costs of approximately $1.2 million from FY20 to FY21. Essential Water has identified that this increase in labour costs is the result of an exercise implemented in that year to reallocate support costs (such as administration costs, management costs, meetings and training for field staff) to the labour category. If this reallocation methodology was responsible for the increase in labour costs, then we would expect to see offsets in other areas of operating costs and/or corporate overheads in this year.

Figure 12 presents a summary of the impact on the FY21 year as a result of the revised allocation methodology (the cost differences between the original and revised allocation methodologies). The figure demonstrates a $1.1 million increase in labour costs, which are offset by reductions in other cost categories (most notably, reductions in materials costs, energy costs, and fleet costs).

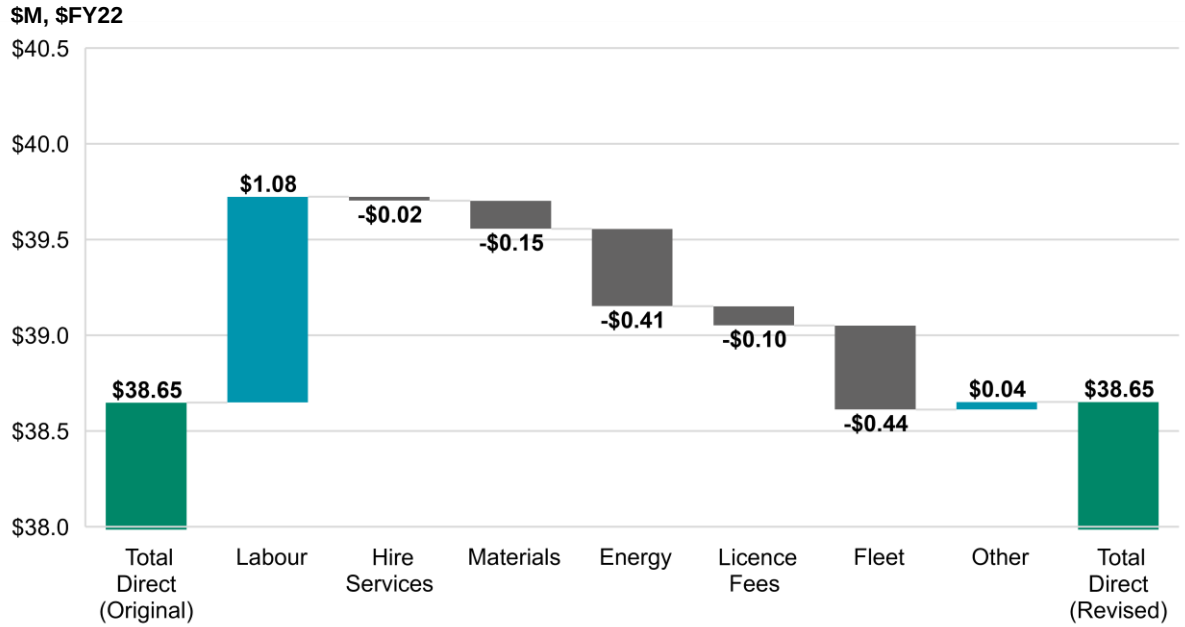

Figure 12 Change in FY21 Cost Attribution Due to Change in Methodology ($ Millions, $FY22)

An additional step up of $0.2 million in labour expenditure is observed for the FY22 year, which is attributed to the introduction of trainees to address the risk of an ageing workforce (and associated recruitment and training costs).

Figure 13 presents a summary of the workload composition (for the period 1 July 2019 to June 2021). Reactive maintenance represents a large portion of the workload (typically, we would expect reactive maintenance to be around 20 to 30% of the total maintenance delivered). The high proportion of reactive maintenance works being delivered is consistent with Essential Water's claim of experiencing high rates of main bursts, as a driver for labour costs. It is expected that significant programs of capital works delivered by Essential Water would reduce the extent of reactive maintenance works required and allow for a reduction in labour costs over time.

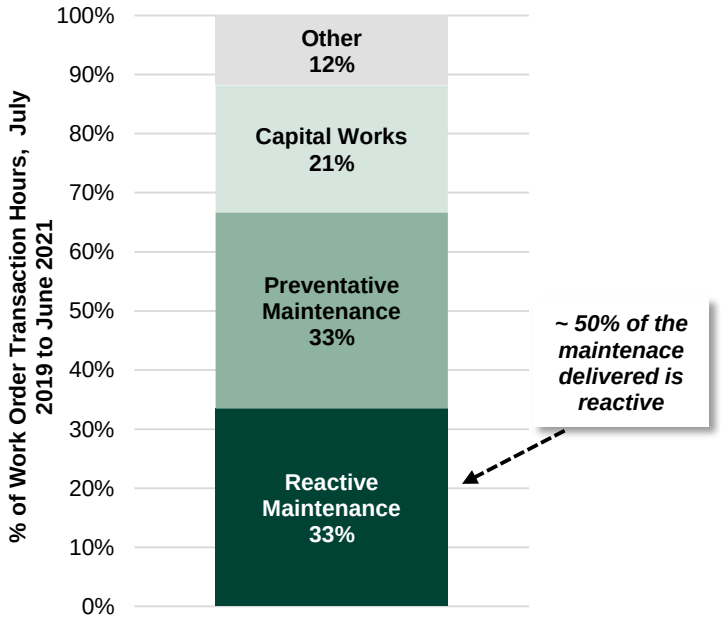

Figure 13 Workload Composition

Findings

The number of FTEs over the 2019 Determination Period has remained constant (and is lower than in earlier years), while labour costs have increased significantly in FY21.

We support with Essential Water/Essential Energy's initiative to more accurately attribute direct costs by reallocating support costs into their relevant categories, however we consider that this should be a cost neutral exercise for Essential Water, and not result in a net increase in costs. Of the $1.2 million cost increase observed, only $1.1 million is offset in other cost categories. As such, we have recommended that the actual labour costs remain unchanged but have proposed a general efficiency adjustment to total operating costs of $0.1 million to reflect the neutrality of this change (Table 17). This adjustment has been applied annually from the FY21 year onwards throughout the 2022 Determination Period.

Table 17 AECOM Recommended Costs, Labour ($ Million, $FY22)

Labour	FY20	FY21	FY22
Water			
Essential Water Proposed	$5.59	$6.67	$6.91
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$5.59	$6.67	$6.91
Sewerage			
Essential Water Proposed	$1.47	$0.00	$0.00
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$1.47	$1.59	$1.60
General Adjustment to Total Operating Costs	*$0.00*	*-$0.12*	*-$0.12*

6.1.4 Fleet Costs

Fleet costs for the 2019 Determination Period (as shown in Figure 14) were $1.5 million more than the IPART allowance and represent a step up from previous historical costs. There is a cost decrease over FY20 to FY21, corresponding with a reallocation of support costs of $0.4 million from fleet to labour. Fleet costs reflect a share of Essential Energy's fleet costs based on the number of hours used to provide Essential Water's services. The proposal states that the increase is the result of both the total Essential Energy fleet costs increasing, and the number of hours spent supporting Essential Water services have increased.

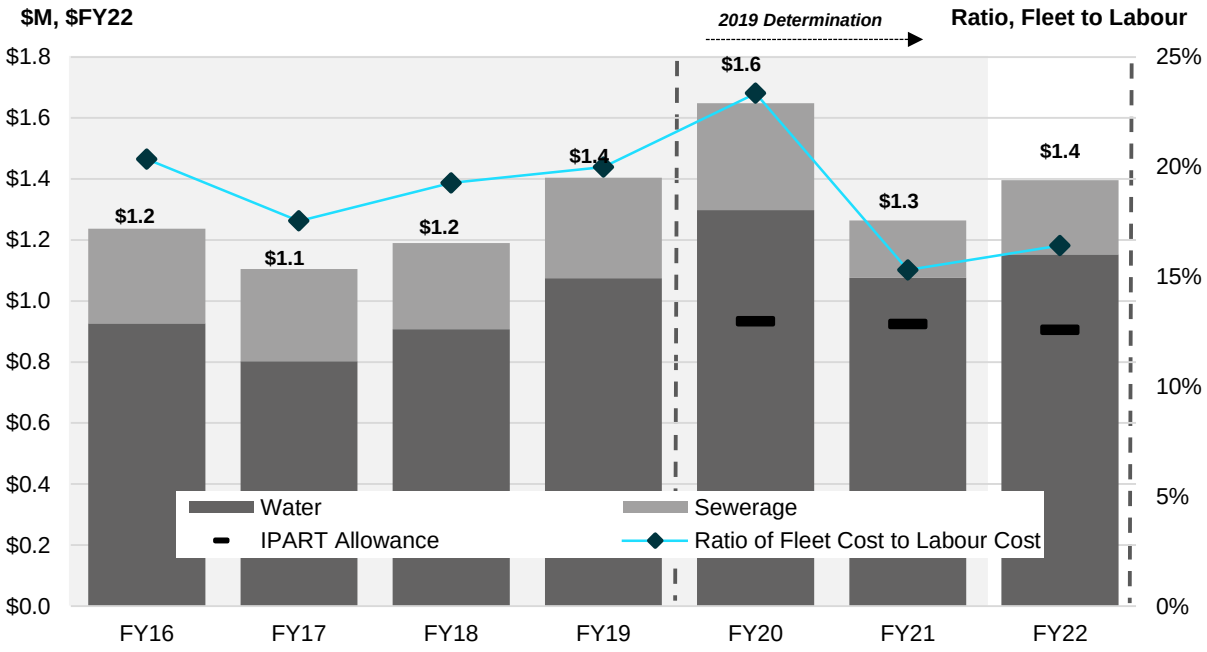

Figure 14 Operating Expenditure, Fleet ($ Millions, $FY22)

Essential Energy total fleet cost increases are attributed to:

- The renewal and upgrade of Essential Energy's fleet via a targeted reduction in age profile.
- Additional maintenance being brought in-house by Essential Energy has increased overall fleet costs. This has not been listed as a reason for the step up in labour costs of Essential Water, and we have seen both

labour and hire services costs exceed the allowances, and so it may be expected that the allocation to Essential Water would be reduced by this factor.

- The installation of IVMS in all Essential Energy and Essential Water vehicles for safety purposes. These measure the speed and location of the vehicles and allow for immediate response in the event of duress, in addition to automatic activation from sudden impact. A duress button can be manually activated if the occupant is under threat or in an accident. Given the geographically dispersed and remote locations of service areas of Essential Energy and Essential Water, the investment in the IVMS for fleet vehicles is a prudent one to effectively manage safety risks.

Increases in hours used to provide Essential Water services have largely been attributed to Essential Water's limited capacity to control labour costs over the period.

Findings

The ratio of fleet to labour costs varies year on year, and generally moves with fleet costs over time. This is not consistent with the suggestion that labour is a major driver of fleet costs. As mentioned in the proposal, these fluctuations may be the result of increases in total fleet costs due to the rollout of the IVMS and the upgrade program introduced. We consider the fleet costs to be reasonable and efficient due to this reason (as shown in Table 18).

Table 18 AECOM Recommended Costs, Fleet ($ Million, $FY22)

Fleet	FY20	FY21	FY22
Water			
Essential Water Proposed	$1.30	$1.08	$1.15
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$1.30	$1.08	$1.15
Sewerage			
Essential Water Proposed	$0.35	$0.19	$0.24
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.35	$0.19	$0.24

6.1.5 Materials and Energy Costs

The materials and energy costs for the 2019 Determination Period are presented in Figure 15 and Figure 16 respectively.

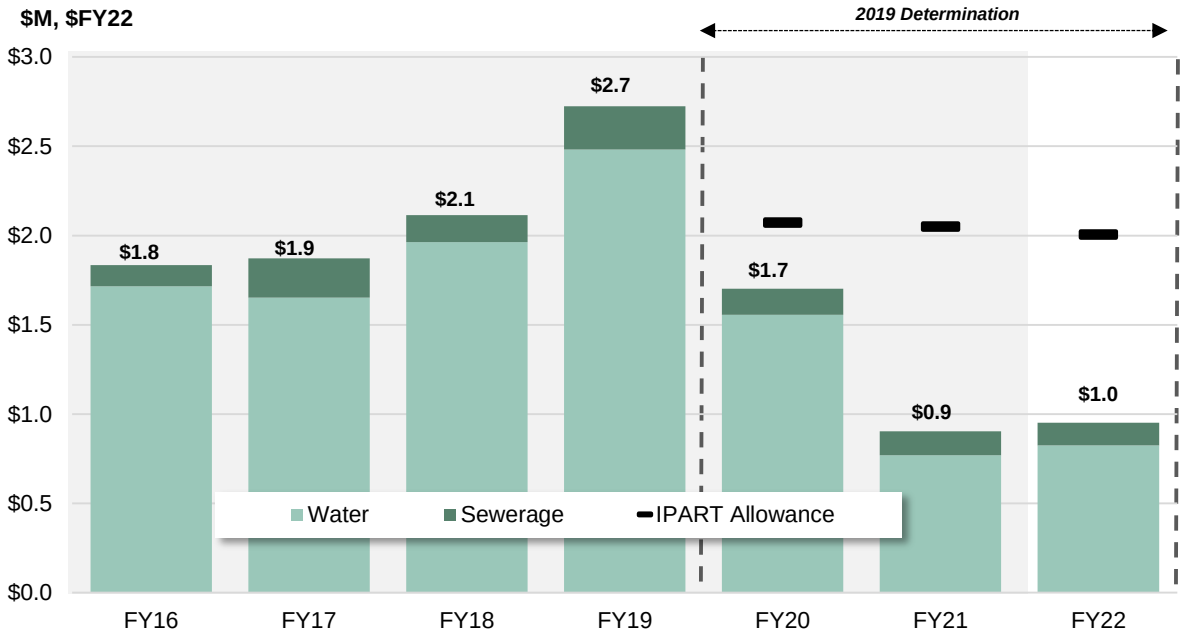

Figure 15 Operating Expenditure, Materials ($ Millions, $FY22)

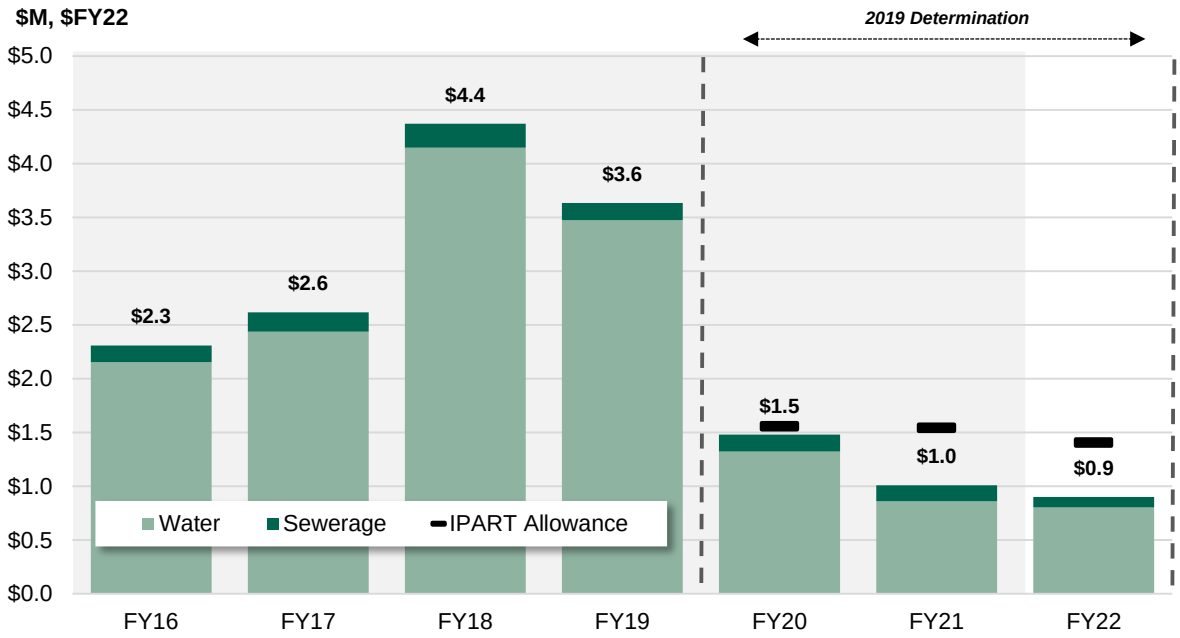

Figure 16 Operating Expenditure, Energy ($ Millions, $FY22)

Materials and Energy costs were $2.8 million combined less than the IPART allowance in the 2019 Determination. Essential Water has attributed this to the reduced water treatment requirements arising from sourcing most water from the new Broken Hill Pipeline. These reductions appear to be consistent with the introduction of the Pipeline and can be seen to remain relatively stable into the 2022 Determination Period. We consider these to be efficient and reflective of the reasons provided. No adjustments to Essential Waters materials costs (Table 19) or energy costs (Table 20) are recommended.

Table 19 AECOM Recommended Costs, Materials ($ Million, $FY22)

Materials	FY20	FY21	FY22
Water			
Essential Water Proposed	$1.56	$0.77	$0.82
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$1.56	$0.77	$0.82
Sewerage			
Essential Water Proposed	$0.14	$0.13	$0.13
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.14	$0.13	$0.13

Table 20 AECOM Recommended Costs, Energy ($ Million, $FY22)

Energy	FY20	FY21	FY22
Water			
Essential Water Proposed	$1.32	$0.86	$0.80
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$1.32	$0.86	$0.80
Sewerage			
Essential Water Proposed	$0.16	$0.15	$0.10
AECOM Adjustment	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.16	$0.15	$0.10

6.1.6 Corporate Overheads

Table 21 presents a summary of the recommended corporate overhead costs for the 2019 Determination Period. Adjustments are made to account for high expenditure in FY22 and due to adjustments made to direct operating costs. The detailed review is provided at Section 5.4.

Table 21 AECOM Recommended Costs, Corporate Overheads ($ Million, $FY22)

Corporate Overheads	FY20	FY21	FY22
Water			
Essential Water Proposed	$1.54	$1.63	$2.59
AECOM Adjustment	$0.00	-$0.05	-$1.04
AECOM Recommended Costs	$1.54	$1.58	$1.56
Sewerage			
Essential Water Proposed	$0.33	$0.28	$0.42
AECOM Adjustment	$0.00	-$0.01	-$0.17
AECOM Recommended Costs	$0.33	$0.28	$0.25

6.1.7 Recommended Efficient Costs

Table 22 presents a summary of the recommended adjustments to Essential Water's operating expenditure over the 2019 Determination Period and recommended efficient costs.

Table 22 Essential Waters Operating Costs for the 2019 Determination Period ($ Million, $FY22)

	FY20	FY21	FY22
Essential Water Costs			
Water	$36.60	$36.46	$36.78
Sewerage	$2.26	$2.18	$2.44
Corporate Overheads	$1.87	$1.91	$3.02
Total	**$40.74**	**$40.56**	**$42.23**
AECOM Recommended Adjustments			
Water	$0.00	-$0.11	-$0.11
Sewerage	$0.00	-$0.01	-$0.01
Corporate Overheads	$0.00	-$0.01	-$1.14
Total	**$0.00**	**-$0.13**	**-$1.25**
Efficient Costs			
Water	$36.60	$36.35	$36.67
Sewerage	$2.26	$2.18	$2.43
Corporate Overheads	$1.87	$1.90	$1.88
Total	**$40.74**	**$40.43**	**$40.98**

Figure 17 presents a graphical representation of the recommended operating costs, where the stacked bars (and reported totals) are AECOM recommended costs and the black markers represent Essential Water's costs (all expressed in $FY22).

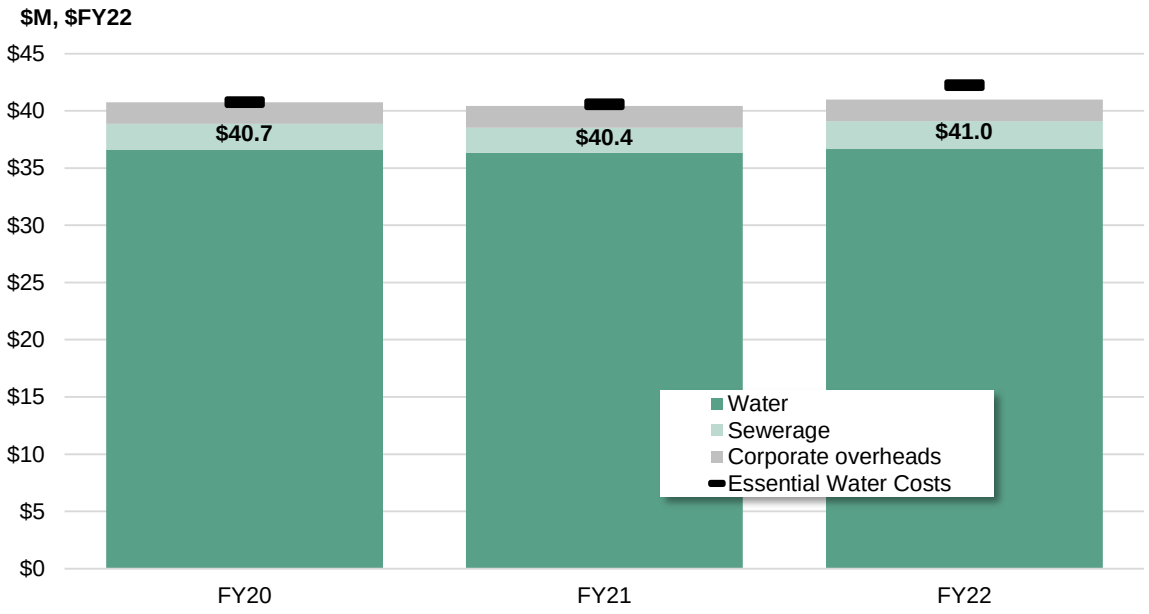

Figure 17 Essential Waters Operating Costs for the 2019 Determination Period ($ Million, $FY22)

Table 23 presents the efficient costs de-escalated to nominal dollars.

Table 23 Essential Waters Operating Costs for the 2019 Determination Period ($ Million, Nominal)

	FY20	FY21	FY22
Efficient Costs			
Water	$34.87	$35.47	$36.67
Sewerage	$2.15	$2.12	$2.43
Corporate Overheads	$1.78	$1.85	$1.88
Total	**$38.81**	**$39.44**	**$40.98**

6.2 Proposed Operating Expenditure for 2022 Determination Period

AECOM's review of Essential Water's proposed operating expenditure for the forward 2022 Determination Period is provided below.

6.2.1 Summary of Key Findings

- Essential Water has proposed operating costs for the 2022 Determination Period which are lower than historical costs and reflect a commitment to ongoing efficiency.
- For most cost categories, we have found costs to be efficient, with a few exceptions as noted below.

We have recommended adjustments to Essential Water's proposed operating costs for:

- Labour costs, which are higher over the 2022 Determination Period compared to historic costs despite changes to the network which we consider should deliver cost benefits (namely, the Broken Hill Pipeline, Wills Street Sewage Treatment Plant and the decommissioning of the Menindee Pipeline).
- Continuation of the general $0.1 million adjustment to total operating costs applied in FY21 and FY22 over the 2022 Determination Period. As for the historical costs, this has been recommended to offset the corresponding increase in labour costs attributed to the improved attribution of support costs to direct labour, which we consider should be a cost neutral exercise.
- Hire service costs. We do not accept Essential Water's approach to forecasting. It is our view that the forecast should be based on a bottom-up analysis of contractor requirements by activity. In the absence of this, we have sought to remove one-off expenditures from the calculation of the regular/base work pattern for contractor works (namely, FY18 which was an anomalously high cost year including numerous one-off expenditures).
- Fleet costs. We would expect that cost reductions would be observed over the 2022 Determination Period due to the introduction of newer vehicles. It is recommended that an average cost for the 2022 Determination Period of $1.3 million per annum be adopted (which excludes the anomalously high costs in FY25 and FY26).
- A general efficiency adjustment of $0.6 million to total operating costs from FY26 onwards to account for cost reductions expected to be achieved as a result of the corporate transformation program.
- Corporate overhead costs, as a result of the direct cost adjustments.

We recommend that Essential Energy explore opportunities to realise potential cost savings, noting that the attraction and retention of suitable staff has been raised by Essential Water as a key barrier to achieving the expected cost offset relating to the Broken Hill Pipeline, but that it faces imminent retirement of a significant portion of its staff:

- We understand that there is currently no sharing of resources between Essential Energy and Essential Water (such as labour), noting that there are constraints to achieving this (such as different requirements for training, and different employee agreements). In particular, while they are not currently prohibitive, we acknowledge that ring-fencing arrangements between Essential Energy and Essential Water would bring complexities to the sharing of staff, and that such arrangements would be subject to future changes in the conditions of the ring-fencing arrangements. It is recommended that Essential Water investigate opportunities to overcome these barriers for sharing resources with Essential Energy.
- Further (alternatively), there could be a shift from contractor costs to labour (utilising existing staff), with an increase in training to achieve this. We acknowledge that multi-skilling of Essential Water staff already occurs to some extent, however, we expect that further analysis would identify opportunities for additional up-skilling. As noted in the review of Essential Waters Asset Management Planning at Section 4.2), there is currently a reduced appetite for training and upskilling due to restrictions around staff redundancies and an aging workforce. This would represent a shift in the status quo, however could (with careful management) enable Essential Water to realise cost savings.

6.2.2 Overview of Proposed Operating Expenditure

Essential Water's operating expenditure for water supply from FY16 to FY27 is provided at Figure 18, with values expressed in $FY22. The coloured bars represent actual costs (up to FY21) and forecast costs from FY22 to FY27. The light green markers represent the allowance made by IPART in the 2019 Determination.

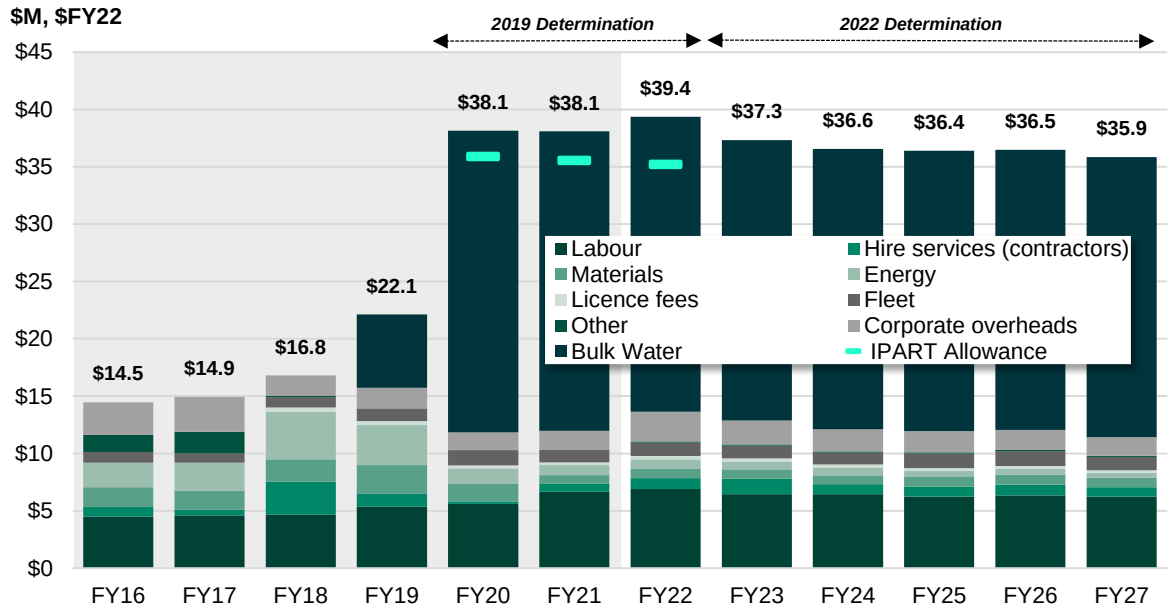

Figure 18 Operating Expenditure, Water Supply ($ Millions, $FY22)

Water supply costs have increased substantially with the introduction of the Broken Hill Pipeline (with bulk water purchases representing 67% of the total water supply cost over the 2022 Determination Period). We understand however, that Essential Water does not propose to pass these costs onto customers.

Figure 19 presents the operating expenditure for water supply, excluding bulk water purchases and license fees associated with drawing water from the Murray River. The blue markers represent Essential Waters proposed costs (for the relevant determination period).

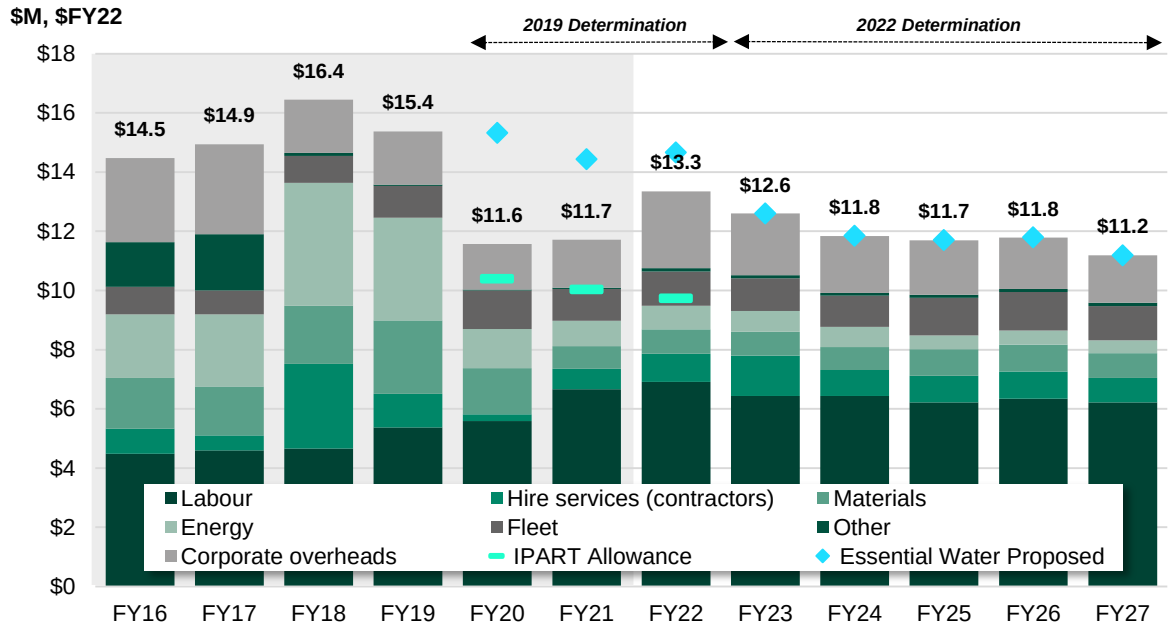

Figure 19 Operating Expenditure, Water Supply Excluding Bulk Water ($ Millions, $FY22)

Excluding bulk water purchases and license fees, average costs has decreased by around 16% over the 2022 Determination Period, with average cost of $14.1 million over the FY16 to FY21 period and an average cost of $11.8 million over the FY23 to FY27 period.

Major operating activities for water supply are outlined in the proposal as:

- **Water Mains and pipelines** - Inspections and testing of water mains, inspecting cathodic protection, planned maintenance, patches and repairs or replacement of concrete chairs and emergency repairs.
- **Reservoirs** – inspection, measuring and recording of water levels and quality, inspections and reporting for dam maintenance, clearing of surrounding catchments, and inspections and maintenance of associated plant, valves, pipes and buildings.
- **Tanks** – condition inspections, inspection of cathodic protection and planned maintenance such as painting exteriors
- **Pumping Stations** – inspection, testing, measuring and repairs of electrical and mechanical equipment.
- **Reticulation** – patrol, inspection and testing, repairs (planned and reactive), cleaning of reticulation with high pressure air injection, and operation of valves, hydrants and other apparatus.
- **Water Treatment Plants** – 24/7 operation of the treatment plant, as well as routine inspection, testing and monitoring, maintenance of building and grounds and ancillary services.

Essential Water's operating expenditure for sewerage from FY16 to FY27 is provided at Figure 18, with values expressed in $FY22. The coloured bars represent actual costs (up to FY21) and forecast costs from FY22 to FY27. The light green markers represent the allowance made by IPART in the 2019 Determination, and the light blue markers represent Essential Waters proposed costs (for the relevant determination period).

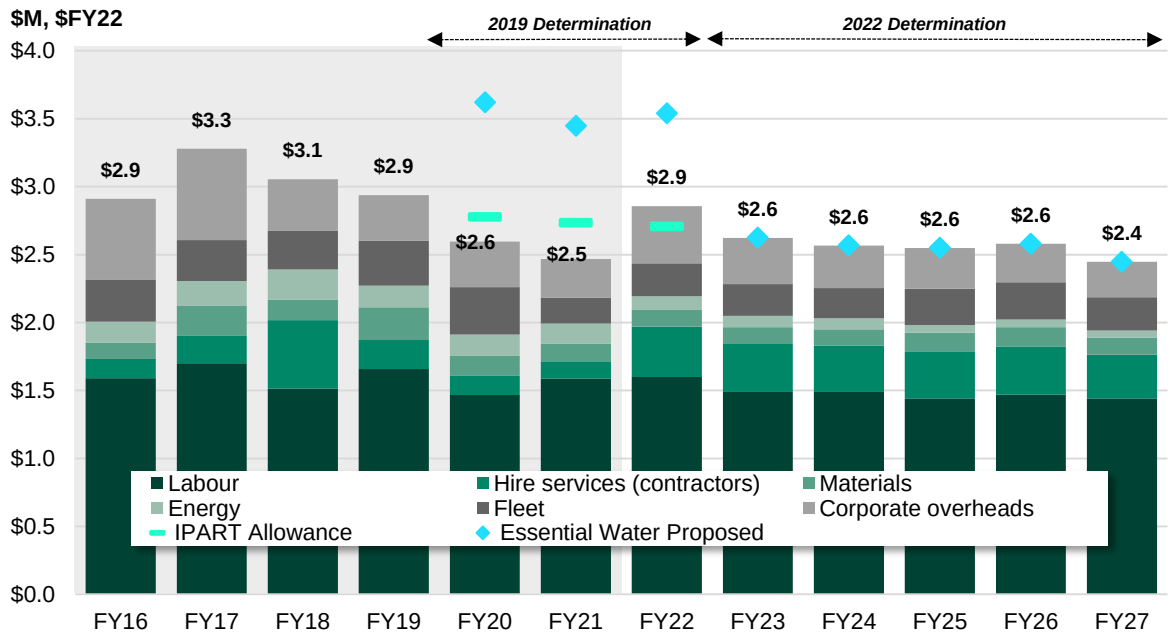

Figure 20 Operating Expenditure, Sewerage ($ Millions, $FY22)

Average costs decreased by around 11% over the 2022 Determination Period, with average cost of $2.44 million over the FY16 to FY21 period and an average cost of $2.25 million over the FY23 to FY27 period. Labour is the single largest cost, accounting for 65% of the total direct sewerage expenditure.

Major operating activities for sewerage are outlined in the proposal as:

- **Pumping Stations** – inspection, testing, measuring and repairs of electrical and mechanical equipment., clearing.
- **Reticulation** – patrol, inspection and testing, repairs (planned and reactive), clearing with a high-pressure jet and vacuum pumps, operation of valves and other apparatus.
- **Sewerage Treatment Plants** –manual operation of the Wills Street and South Broken Hill treatment plants over normal working hours, as well as routine inspection and maintenance.

The direct operating costs relating to water supply and sewerage are discussed in turn in the following sections.

6.2.3 Bulk Water

Figure 21 presents Essential Waters expenditure for bulk water purchases. The expenditure is comprised of two elements, a fixed charge (charged on a $ per day basis) and a usage charge (charged per kL of water supplied). The average historic cost is represented by the dashed line, calculated in relation over the FY20 to FY21 period (noting that the pipeline was not operational or operational for the full year in the periods prior).

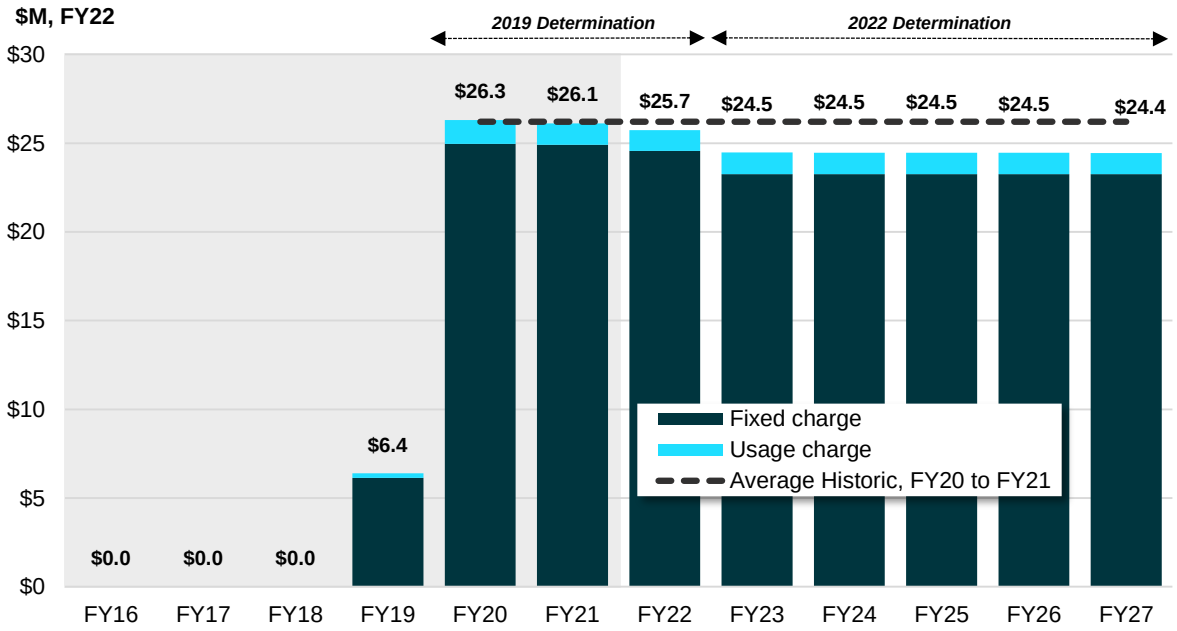

Figure 21 Bulk Water ($ Millions, $FY22)

The fixed charge represents 95% the total expenditure forecast for the 2022 Determination Period. The total cost of bulk water purchases over the 2022 Determination Period is lower than the historic average, noting lower volumes of water volumes and a lower fixed charge.

Findings

Bulk water costs are largely fixed, and variable charge decreases with lower volumes of water over the 2022 Determination Period. For these reasons, bulk water expenditure is considered reasonable over the 2019 and 2022 Determination Periods (Table 24). However, WaterNSW's fixed charges and usage charges for water transportation services provided by the pipeline are subject to a separate determination. As such, the final efficient bulk water costs are subject to the outcomes of separate reviews of WaterNSW's pipeline expenditure which are being undertaken by AECOM and the Centre for International Economics (CIE).

As discussed at Section 4.4, the decision to source most of the water via the pipeline has other cost implications (namely materials, energy and labour) which are discussed in turn over the following sections.

Table 24 AECOM Recommended Costs, Bulk Water ($ Million, $FY22)

Bulk Water	FY23	FY24	FY25	FY26	FY27
Essential Water Proposed	$24.48	$24.47	$24.46	$24.45	$24.45
AECOM Adjustment	$0.00	$0.00	$0.00	$0.00	$0.00
AECOM Recommended Costs	$24.48	$24.47	$24.46	$24.45	$24.45

**Excluding continuing efficiency adjustment.*

6.2.4 Licence Fees

Figure 22 presents expenditure for license fees, associated with drawing water from the Murray River. As for bulk water purchases, the average historic cost (represented by the dashed line) is calculated over the FY20 to FY21 period, to represent typical operating conditions.

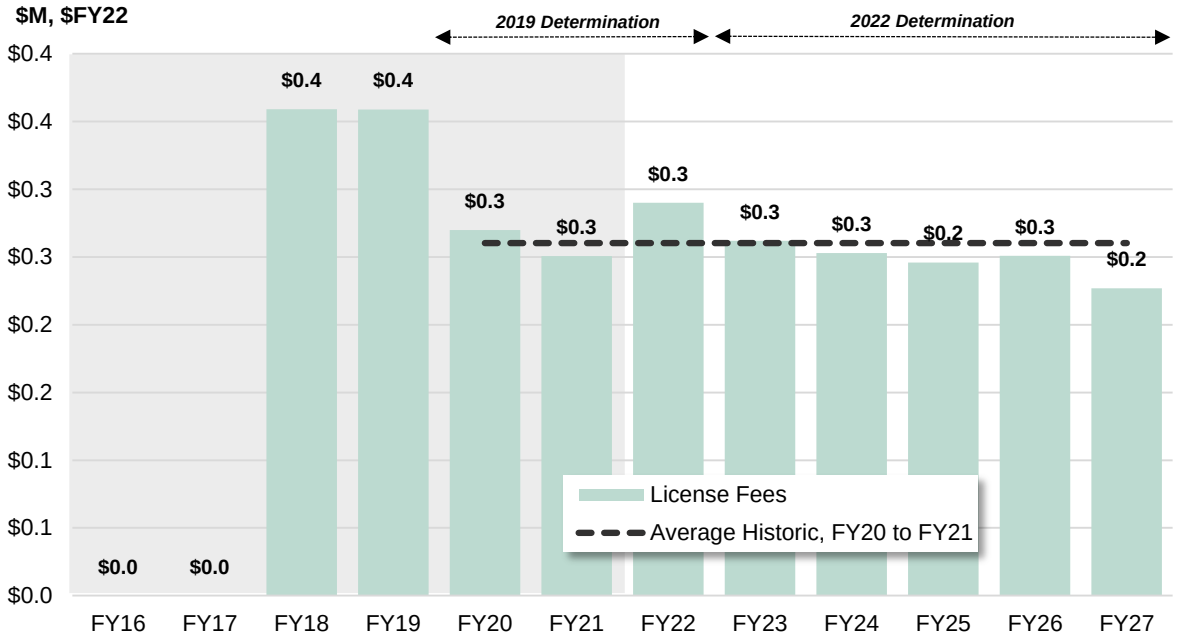

Figure 22 License Fees ($ Millions, $FY22)

License fees are relatively stable over the determination period, and on average are lower on than the historic cost.

Findings

License fees are largely an uncontrollable bulk water cost for Essential Water. This expenditure is therefore considered reasonable over the 2019 and 2022 Determination Periods (Table 25).

Table 25 AECOM Recommended Costs, License Fees ($ Million, $FY22)

License Fees	FY23	FY24	FY25	FY26	FY27
Essential Water Proposed	$0.26	$0.25	$0.25	$0.25	$0.23
AECOM Adjustment	$0.00	$0.00	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.26	$0.25	$0.25	$0.25	$0.23

**Excluding continuing efficiency adjustment.*

6.2.5 Labour

Figure 23 presents a summary of the labour cost. The average historic cost is calculated over the FY16 to FY21 period. The number of FTEs is represented by the dashed blue line.

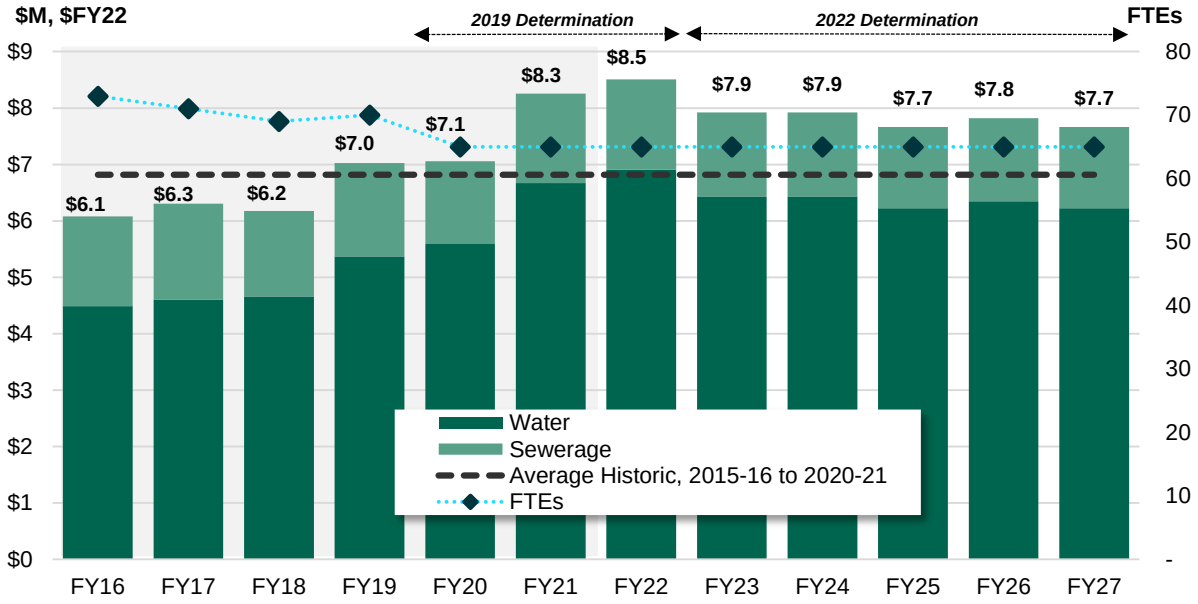

Figure 23 Labour ($ Millions, $FY22)

Expenditure over the 2022 Determination Period is on average 14% higher than historic (21% higher for water supply and 8% lower for sewerage). On average, FTE numbers over the 2022 Determination Period are 6% lower than historic. While the introduction of the Broken Hill Pipeline should in theory allow for a reduction in labour for water supply, Essential Water has nominated several reasons why costs have increased:

- There is a more accurate attribution of labour costs from FY21 (with support costs which were previously absorbed between various cost expenditure categories now being directly attributed to labour).
- There are higher levels of reactive works required to address deteriorating pipeline assets (where resources have been shifted from the delivery of capital works to address water main breaks and leaks).
- Essential Water has an aging workforce and has a need to manage the risk associated with retirement of labour with specialist skills and institutional knowledge. The need to recruit and train new staff is expected to continue over the 2022 Determination Period.

The NSW Government Direction preventing forced or voluntary redundancies over FY20, due to the role of Essential Water in providing local employment, has now expired. However, Essential Water has stated a social obligation to avoid bringing these back too quickly. This is reflected in Essential Energy's policy to avoid redundancies until 2023-2024, suggesting that labour savings will continue to be limited in the 2022 Determination Period.

The proposed stable FTE base over the 2022 Determination Period (58 FTEs) implies that any staff lost as a result of natural attrition would be replaced by trainees to support business continuity. While the new trainees may have less experience than the FTEs who they replace, Essential Water would incur training and recruitment costs.

Essential Water has proposed initiatives to manage labour costs over the 2022 Determination Period, including to reduce overtime, reduce travel costs, and enable better tracking and cost controls. Essential Water has included reductions to labour cost over the 2022 Determination Period to account for this.

Findings

FTEs are projected to remain stable over the 2022 Determination Period, which is reflected in the stable labour costs. However, there are significant increases in costs from historic to proposed, particularly in the water supply area, whereas FTEs appear to have consistently been reducing over this period. As found in the 2019 Determination Period cost review, we find that the increased labour costs because of the move towards more accurate attribution of direct costs is acceptable but should be a cost neutral exercise. Therefore, we propose that the general adjustment to total operating costs we recommend for FY21 and FY22 ($0.1 million) is carried through for the 2022 Determination Period. We consider that this is a catch-up adjustment.

In addition to this adjustment, we consider that there are several initiatives in place that should result in efficiencies being achieved and reductions in future operating costs, which are not observed in the proposed labour costs. These are:

- The decommissioning of the Menindee Pipeline is expected to provide a reduction of four FTEs, as stated by Essential Water in its 2019 Pricing Proposal. This project was initially due to be completed in the 2019 Determination Period, but has been delayed, and is still a 'few years away' according to Essential Water. Once this the pipeline decommissioned, we would expect these efficiencies to be realised and we recommend an adjustment to labour costs equal to the costs of four FTEs ($0.4 million per annum). This adjustment is an annual adjustment to be introduced in FY23. We consider this to be a scope adjustment.
- The business case for the Wills St WWTP project notes two benefits which relate to improved operating cost outcomes – the introduction of a more efficient plant and the decommissioning of the South WWTP. Essential Water has not quantified the anticipated savings. The project is intending to be commissioned in FY25 and based on this we recommend an efficiency adjustment equivalent to one FTE ($0.1 million per annum) be introduced annually from this year to realise these efficiencies. We consider this to be a scope adjustment.

In relation to these recommended adjustments, Essential Water has contended that FTE reductions (beyond the 65 FTEs forecast) would result in staffing levels falling below safe operating levels and risk the standard and reliability of services provided to customers. Essential Water has also noted:

- Risks associated with natural attrition of staff, and the attraction and retention of new skilled staff to the area.
- The delivery of some maintenance works takes longer than it historically has. Specifically, the introduction of the NBN into Broken Hill in 2020 (and installation of fibre optic cables around Essential Water's water mains) has resulted in vacuum excavation being required in place of backhoes to safely deliver maintenance works.

Essential Water has not nominated the basis upon which it considers 65 FTEs to reflect the minimum staffing level. Without analysis of staff numbers and productivity, we are not able to confirm the contention that these FTEs are required. We maintain that there should be efficiencies realised along with the decommissioning of the Menindee Pipeline and completion of the Wills St WWTP project. The issue with minimum staffing levels (and redundancy constraints) may be valid, however this adjustment is made several years in the future, and there should be opportunity for Essential Water to address these issues. Further, as cited by Essential Water, the average age of the workforce is already high and there will be attrition irrespective of this proposed adjustment.

Table 26 shows our recommended adjustments and efficient costs for labour.

Table 26 AECOM Recommended Costs, Labour ($ Million, $FY22)

Labour	FY23	FY24	FY25	FY26	FY27
Water					
Essential Water Proposed	$6.43	$6.43	$6.22	$6.35	$6.22
AECOM Adjustment	$0.00	$0.00	-$0.40	-$0.40	-$0.40
AECOM Recommended Costs	$6.43	$6.43	$5.82	$5.95	$5.82
Sewerage					
Essential Water Proposed	$1.49	$1.49	$1.44	$1.47	$1.44
AECOM Adjustment	$0.00	$0.00	$0.00	-$0.10	-$0.10
AECOM Recommended Costs	$1.49	$1.49	$1.44	$1.37	$1.34
General Adjustment to Total Operating Costs	*-$0.12*	*-$0.12*	*-$0.12*	*-$0.12*	*-$0.12*

**Excluding continuing efficiency adjustment.*

6.2.6 Hire services

Figure 24 presents a summary of the contractor costs. The average historic cost is calculated over the FY16 to FY21 period.

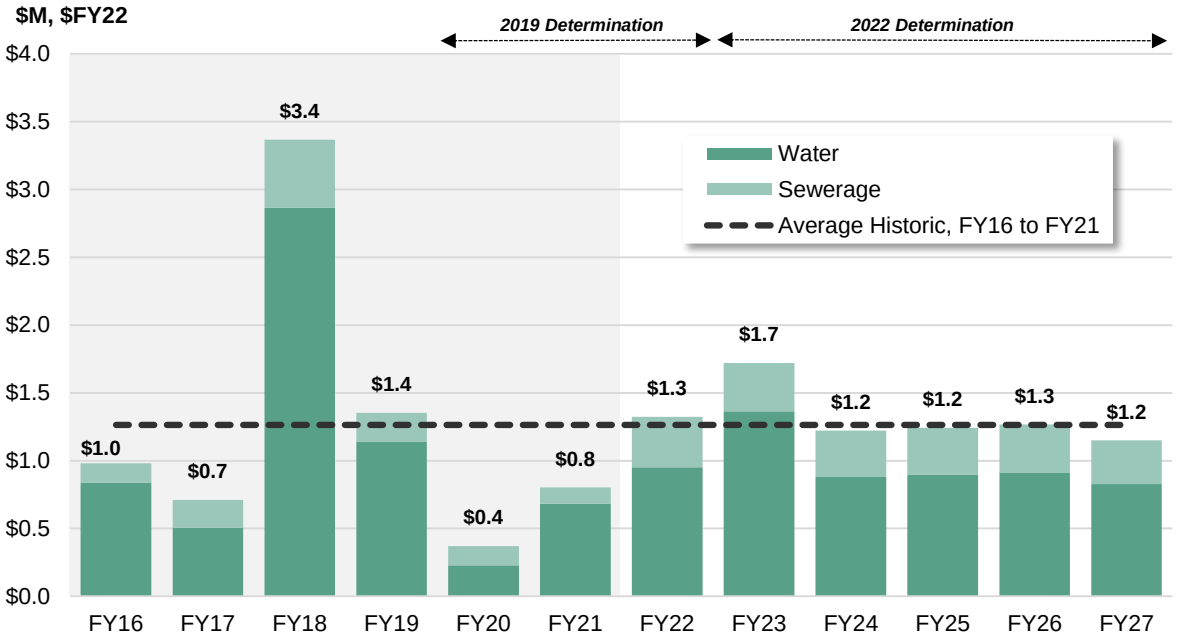

Figure 24 Hire Services ($ Millions, $FY22)

Expenditure over the 2022 Determination Period is on average 4% higher than historic. There is an atypically high level of expenditure in FY23 reflecting preparation of a comprehensive Water Storages Strategy, planned at a cost of $0.5 million (the need for which was identified as part of the Integrated Water Cycle Management Strategy).

Essential Water advised that forecast hire services costs (as a whole) are based on historic expenditure, then split into water and sewerage with some adjustments made to account for one-off works over the forward period (namely, the comprehensive Water Storages Strategy). Essential Water has not advised on what years were included in the historic average, and the basis for this. However, we observe that the average level of expenditure ($1.22 million over the forward period, excluding the $0.50 million in FY23 associated with the comprehensive Water Storages Strategy) appears aligned with the historic average from FY16 to FY21 (of $1.26 million).

Findings

Contractors are reasonably required for the provision of specialist skills and services. While there may be some opportunity for a trade-off between labour and contractor costs, this is limited by the capabilities of staff (and additional training may be required to achieve a shift from contracting to delivery in house).

We do not accept Essential Water's approach to forecasting. It is our view that the forecast should be based on a bottom-up analysis of contractor requirements by activity. Annual variability is indicated by the historical data (for instance, the spike in expenditure occurring in FY18), and there is no obvious rationale to suggest that the historical pattern of activity would continue into the next determination period. Essential Water has not provided its expectation of contractor requirements by activity for that period.

In the absence of any further information, we have sought to remove one-off expenditures to identify a regular/base work pattern for contractor works and have projected that forward assuming that the regular contract work will continue over the determination period. We observed that the high expenditure in FY18 was due to one-off consultancy costs for project assessments and business cases with new supply arrangements, as well as consultancy fees related to IWCMS and regulatory compliance. Thus, we excluded this year from our calculation of the average regular/base work pattern for contractor works.

We recommend an average cost of $0.84 million (with allocations between water and sewerage as specified by Essential Water), and with an additional cost of $0.50 million in FY23 associated with the comprehensive Water Storages Strategy. These are scope adjustments. Recommended costs are presented at Table 27.

We recommend however that for future determinations, the requirement for contractors should be based on a forecast of activity.

Table 27 AECOM Recommended Costs, Hire Services ($ Million, $FY22)

Hire Services (contractors)	FY23	FY24	FY25	FY26	FY27
Water					
Essential Water Proposed	$1.37	$0.88	$0.90	$0.91	$0.83
AECOM Adjustment	-$0.26	-$0.27	-$0.29	-$0.31	-$0.22
AECOM Recommended Costs	$1.11	$0.61	$0.61	$0.61	$0.61
Sewerage					
Essential Water Proposed	$0.35	$0.34	$0.35	$0.36	$0.32
AECOM Adjustment	-$0.12	-$0.11	-$0.11	-$0.12	-$0.09
AECOM Recommended Costs	$0.24	$0.24	$0.24	$0.24	$0.24

**Excluding continuing efficiency adjustment.*

6.2.7 Materials

Figure 25 presents a summary of the materials cost attributed to water supply. The average historic cost is calculated over the FY16 to FY21 period.

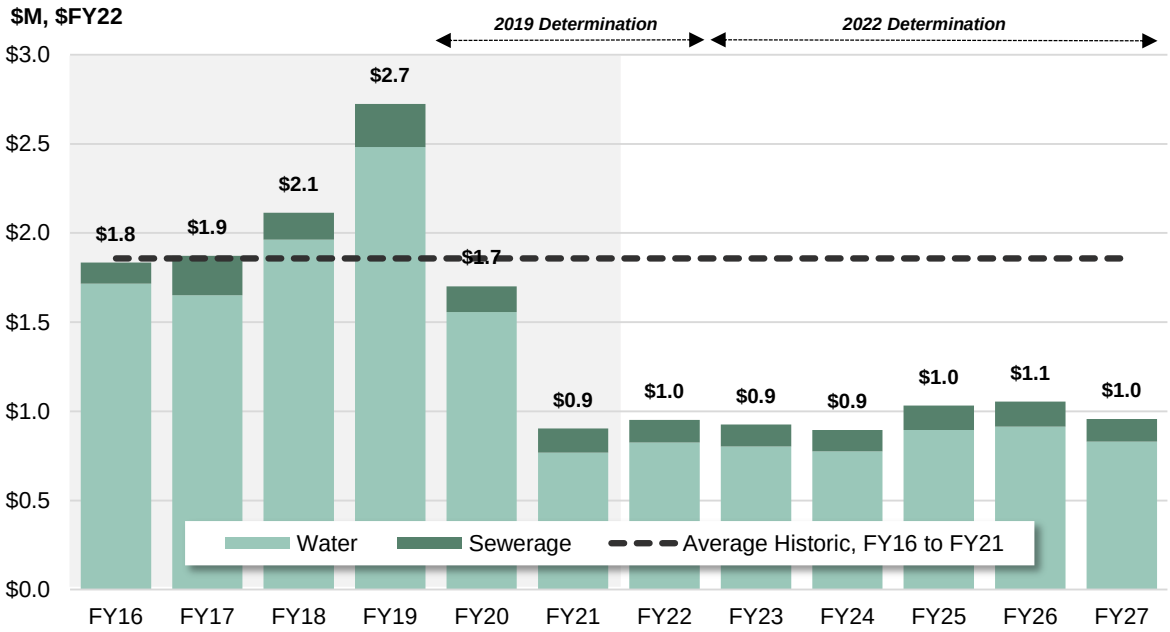

Figure 25 Materials ($ Millions, $FY22)

Expenditure over the 2022 Determination Period is on average 48% lower than historic. The primary driver for this reduction is a decrease in the quantities of chemicals required for water treatment, with the water supplied from the Broken Hill Pipeline being of a higher quality than previous water sources. There also appears to be a possible reallocation of support costs from this cost category onto labour (as discussed at Section 6.2.5). However, the extent to which this reflects reallocation of costs as opposed to reduced quantities of chemicals required for water treatment is unclear.

Findings

The cost of materials has decreased significantly with the introduction of the Broken Hill Pipeline, and the expenditure is considered reasonable and efficient (Table 28).

Table 28 AECOM Recommended Costs, Materials ($ Million, $FY22)

Materials	FY23	FY24	FY25	FY26	FY27
Water					
Essential Water Proposed	$0.80	$0.78	$0.90	$0.91	$0.83
AECOM Adjustment	$0.00	$0.00	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.80	$0.78	$0.90	$0.91	$0.83
Sewerage					
Essential Water Proposed	$0.12	$0.12	$0.14	$0.14	$0.13
AECOM Adjustment	$0.00	$0.00	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.12	$0.12	$0.14	$0.14	$0.13

**Excluding continuing efficiency adjustment.*

6.2.8 Energy

Figure 26 presents a summary of the energy cost. The average historic cost is calculated over the FY16 to FY21 period.

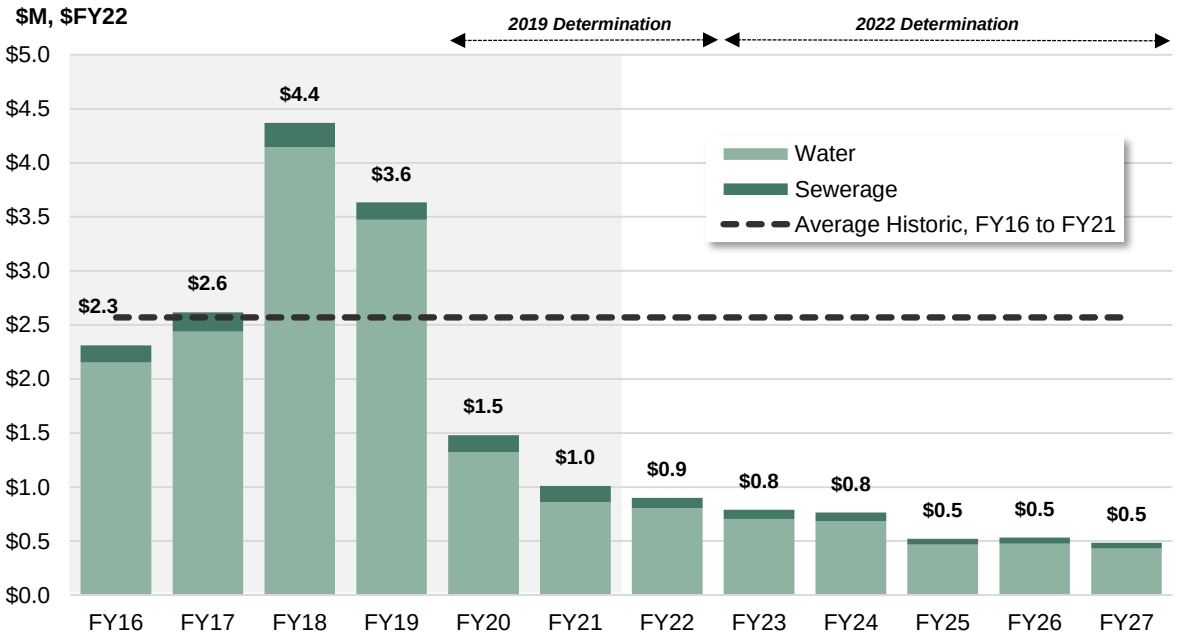

Figure 26 Energy ($ Millions, $FY22)

Expenditure over the 2022 Determination Period is on average 76% lower than historic. As for materials, a key driver for this is a reduction in energy consumed for water treatment of the higher quality water supplied from the Broken Hill Pipeline. The proposed expenditure also reflects ongoing reductions over the 2022 Determination Period due to Essential Energy contract negotiations.

Findings

The cost of energy has decreased significantly with the introduction of the Broken Hill Pipeline, and reductions over the 2022 Determination Period demonstrates a commitment to ongoing efficiency. The expenditure is considered reasonable and efficient (Table 29).

Table 29 AECOM Recommended Costs, Energy ($ Million, $FY22)

Energy	FY23	FY24	FY25	FY26	FY27
Water					
Essential Water Proposed	$0.71	$0.68	$0.47	$0.48	$0.43
AECOM Adjustment	$0.00	$0.00	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.71	$0.68	$0.47	$0.48	$0.43
Sewerage					
Essential Water Proposed	$0.08	$0.08	$0.06	$0.06	$0.05
AECOM Adjustment	$0.00	$0.00	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.08	$0.08	$0.06	$0.06	$0.05

**Excluding continuing efficiency adjustment.*

6.2.9 Fleet

Figure 27 presents a summary of the fleet cost attributed to water supply. The average historic cost is calculated over the FY16 to FY21 period. Fleet costs are allocated from Essential Energy to Essential Water (between water and sewerage) based on the number of hours which fleet assets are used to deliver services. Essential Water states that fleet costs are a function of staff numbers. The ratio of fleet cost to labour cost represents this relationship, with FTEs proposed to remain constant over the period. There are unexplained fluctuations in fleet costs that do not support Essential Water's claims.

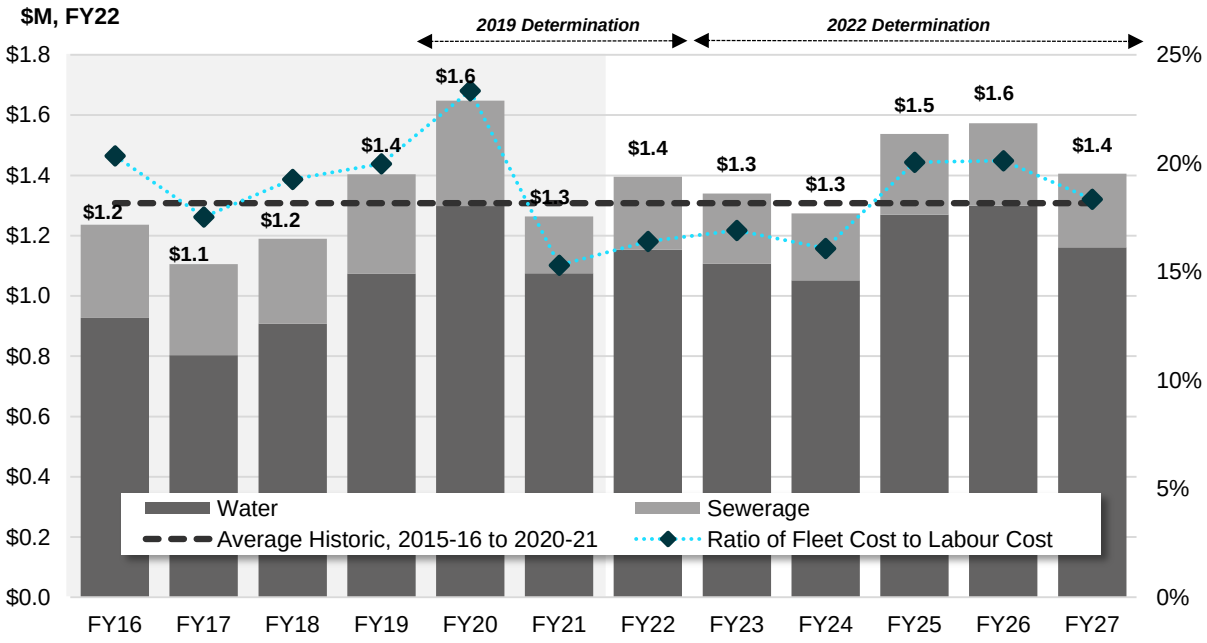

Figure 27 Fleet ($ Millions, $FY22)

Expenditure over the 2022 Determination Period is on average 9% higher than historic.

Fleet renewal costs also appear to be incurred through non-system capital expenditure. An increase in fleet renewals and upgrades (reducing the age profile of the fleet), which began in the 2019 Determination Period should be expected to deliver benefits in future years, such as lower levels of maintenance for newer vehicles. These do not appear to be realised over the 2022 Determination Period.

Findings

Essential Water's allocation is based on hours used to support Essential Water services, and consequently, Essential Water has suggested that fleet costs are a function of labour. However, this does not appear to be consistent with the proposed labour costs and fleet costs, with the ratio showing that fleet costs are not varying in line with labour costs (or in line with the number of FTEs, as shown in Figure 28).

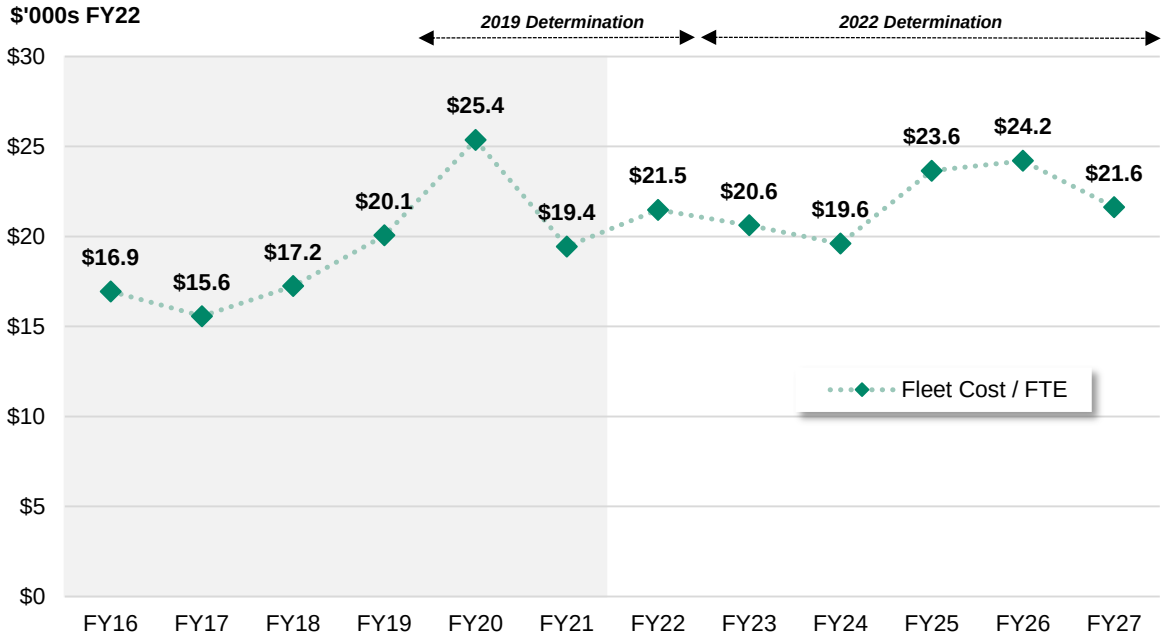

Figure 28 Fleet Cost per FTE ($ Thousands, $FY22)

Despite Essential Water's advice that forecast project head hours have not deviated from those required in the 2019 Determination Period (due to the stable FTE count), we observe higher average costs, and anomalously high fleet costs occur in FY25 and FY26. While increased fleet costs may be the result of Essential Energy's overall fleet costs increasing, the reasons for this are unclear. Rather, we would expect to see some cost reductions as a result of increased investment in newer vehicles due to reduced maintenance requirements on newer assets.

Operating fleet costs observed in FY25 and FY26 (of $1.54 million and $1.57 million respectively) are substantially higher than those allocated in FY21 (of $1.26 million, which includes the cost offset due to direct attribution of support costs to labour). Essential Water contends that the variance in operating fleet expenditure is due to a shift in labour from capital to operating works (and hence in fleet costs from capital expenditure to operating expenditure). We do not consider this as adequate justification for an increase in costs because:

- Essential Water advised that majority of capital works are currently being delivered by contractors and not internal resources.
- We have not been informed of capital works which are being delivered by internal resources occurring specifically in years FY23, FY24, FY27 of the 2022 Determination Period and not in these two years (FY25, FY26).
- There are expected to be reductions in operating expenditure (labour effort) associated with the decommissioning of Menindee Pipeline and Wills St WWTP, which should in practice reduce the allocation of fleet costs to Essential Water operating expenditure.
- Investment in newer vehicles should reduce the maintenance requirements for those newer assets.

For these reasons, we consider that there is no basis for an increased allocation of costs to operating expenditure to occur in these years, and do not consider the forecast expenditure for fleet to be efficient. It is recommended that an average cost for the 2022 Determination Period of $1.3 million per annum be adopted, which excludes the anomalously high costs in FY25 and FY26 (Table 30). This is a catch-up efficiency adjustment.

Table 30 AECOM Recommended Costs, Fleet ($ Million, $FY22)

Fleet	FY23	FY24	FY25	FY26	FY27
Water					
Essential Water Proposed	$1.11	$1.05	$1.27	$1.30	$1.16
AECOM Adjustment	$0.00	$0.06	-$0.16	-$0.19	-$0.05
AECOM Recommended Costs	$1.11	$1.11	$1.11	$1.11	$1.11
Sewerage					
Essential Water Proposed	$0.23	$0.22	$0.27	$0.27	$0.25
AECOM Adjustment	-$0.01	$0.00	-$0.04	-$0.05	-$0.02
AECOM Recommended Costs	$0.23	$0.23	$0.23	$0.23	$0.23

**Excluding continuing efficiency adjustment.*

We would expect that the requirement for routine work would not vary substantially year by year, and that the fleet costs for that activity should not vary substantially year by year. Under the current cost allocation approach, the water business could seemingly end up with higher or lower fleet costs even if the level of operating activity does not change. We recommend that fleet costs should be directly charged to activities or projects. We acknowledge that unutilised fleet time (which cannot be attributed directly) would need to be allocated and propose that these could be allocated as overhead costs are. As the method has been approved by the AER, and as the costs are not material, we acknowledge that the practicality of implementing such a change may be an issue.

6.2.10 Other

Figure 29 presents a summary of other expenditure (all of which are attributed to water supply). The average historic cost is calculated over the FY16 to FY21 period.

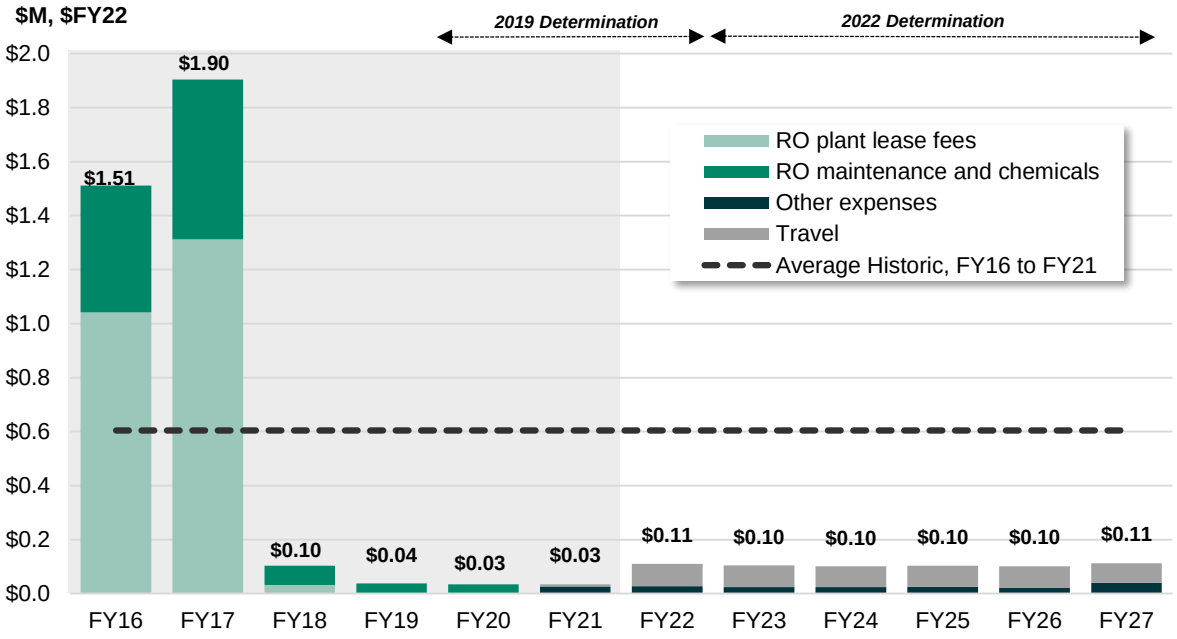

Figure 29 Other Expenditure ($ Millions, $FY22)

Expenditure over the 2022 Determination Period is on average 83% lower than historic. However, the individual cost items included in the other cost category are unrelated (with historical costs relating to reverse osmosis plant no longer in operation). It is unclear whether the costs included over the 2022 Determination Period are new costs or a change in how costs are recorded.

Findings

The expenditure is considered efficient, on the basis that the new categories of expenditure included over the 2022 Determination Period ('travel' and 'other expenses') are minor, and likely represent a change in how costs are recorded (as opposed to new costs).

Table 31 AECOM Recommended Costs, Other ($ Million, $FY22)

Other	FY23	FY24	FY25	FY26	FY27
Essential Water Proposed	$0.10	$0.10	$0.10	$0.10	$0.11
AECOM Adjustment	$0.00	$0.00	$0.00	$0.00	$0.00
AECOM Recommended Costs	$0.10	$0.10	$0.10	$0.10	$0.11

**Excluding continuing efficiency adjustment.*

6.2.11 Corporate Overhead

Table 32 presents a summary of the recommended corporate overhead costs for the 2022 Determination Period. The detailed review is provided at Section 5.4. Adjustments are made to account for changes to direct operating costs. A bottom-line adjustment is included for benefits anticipated of the corporate overhead transformation program.

The corporate transformation program is expected to cost approximately $250 million, according to the Essential Water Pricing Proposal. It is unclear from the Proposal the expected quantified benefits of the Program, however in Essential Energy's previous Pricing Submission to the AER, benefits were expected to be in the order of $273 million, with expected spend of $130 million (in $FY19).[7] Ongoing annual expenditure reductions were expected to peak at $84 million (in $FY19). [8] Of this amount, ongoing annual expenditure reductions of $27 million (in $FY19) were expected due to improvements in field force productivity.[8]

Based in this, an adjustment of $0.61 million from FY26 onwards for cost reductions associated with the corporate transformation program is estimated by:

- Escalating the $27 million (in $FY19) cost reduction associated with improvements in field force productivity for the broader organisation (to $28.3 million in $FY22).
- Estimating the cost reduction to Essential Water, proportional to approximate ratio of Essential Water FTEs to the broader organisation (65 / ~3,000, or 2.2%).

In relation to this adjustment, Essential Water has proposed that the efficiencies from the corporate transformation program are built into the costs forecast over the 2022 Determination Period, as evidenced by a general downward trend in the forecast costs. Essential Water notes that our proposed adjustment would equate to 5-6 FTEs, which it considers is not feasible for a business of its size.

We observe that there is a downward trend in forecast costs, but note that there are other drivers which contribute to this. There is no specific evidence to demonstrate that the corporate transformation initiatives are incorporated to their full expected extent. As such, we maintain our recommended adjustment (as indicated at Table 32). We note that our proposed adjustment is a general adjustment, and not one specifically made to labour costs.

Table 32 AECOM Recommended Costs, Corporate Overheads ($ Million, $FY22)

Corporate Overhead	FY23	FY24	FY25	FY26	FY27
Water					
Essential Water Proposed	$2.08	$1.92	$1.84	$1.74	$1.60
AECOM Adjustment	-$0.03	-$0.02	-$0.05	-$0.08	-$0.07
AECOM Recommended Costs	$2.06	$1.90	$1.79	$1.65	$1.53
Sewerage					
Essential Water Proposed	$0.34	$0.31	$0.30	$0.28	$0.26
AECOM Adjustment	$0.00	$0.00	-$0.01	-$0.01	-$0.01
AECOM Recommended Costs	$0.33	$0.31	$0.29	$0.27	$0.25
General Adjustment to Total Operating Costs	*$0.00*	*$0.00*	*$0.00*	*-$0.61*	*-$0.61*

**Excluding continuing efficiency adjustment.*

[7] Essential Energy (2018). *2019-24 Revised Regulatory Proposal.* https://www.aer.gov.au/system/files/Essential%20Energy%20-%20Revised%20Proposal%20-%20December%202018.pdf
[8] Essential Energy (2018). *2019-24 Regulatory Proposal.* https://www.aer.gov.au/system/files/Essential%20Energy%20-%202019-24%20Regulatory%20Proposal%20-%2020180430%20-%20Public%20%28reduced%20size%29.pdf

6.2.12 Recommended Efficient Costs

Table 33 presents a summary of our recommended adjustments to Essential Water's proposed operating costs (prior to and including application of the continuing efficiency adjustment).

Table 33 Essential Waters Operating Costs for the 2022 Determination Period ($ Million, $FY22)

	FY23	FY24	FY25	FY26	FY27
Essential Water Costs					
Water	$35.26	$34.64	$34.56	$34.76	$34.26
Sewerage	$2.28	$2.25	$2.25	$2.30	$2.19
Corporate Overheads	$2.42	$2.23	$2.14	$2.02	$1.86
Total	**$39.96**	**$39.13**	**$38.95**	**$39.07**	**$38.31**
AECOM Recommended Adjustments					
Water	-$0.36	-$0.32	-$0.96	-$1.55	-$1.33
Sewerage	-$0.13	-$0.11	-$0.16	-$0.31	-$0.24
Corporate Overheads	-$0.04	-$0.03	-$0.07	-$0.14	-$0.11
Total	**-$0.53**	**-$0.47**	**-$1.19**	**-$2.00**	**-$1.69**
Efficient Costs					
Water	$34.89	$34.32	$33.60	$33.20	$32.93
Sewerage	$2.15	$2.15	$2.09	$1.99	$1.94
Corporate Overheads	$2.39	$2.20	$2.07	$1.89	$1.75
Total	**$39.43**	**$38.66**	**$37.76**	**$37.08**	**$36.62**
Efficient Costs, Including Continuing Efficiency Adjustment					
Water	$34.65	$33.84	$32.90	$32.28	$31.79
Sewerage	$2.14	$2.12	$2.05	$1.93	$1.88
Corporate Overheads	$2.37	$2.17	$2.03	$1.83	$1.69
Total	**$39.15**	**$38.13**	**$36.98**	**$36.05**	**$35.35**

Figure 17 presents a graphical representation of the recommended operating costs, where the stacked bars (and reported total) are AECOM recommended costs including the continuing efficiency adjustment, and the black markers represent Essential Waters proposed costs (all expressed in $FY22).

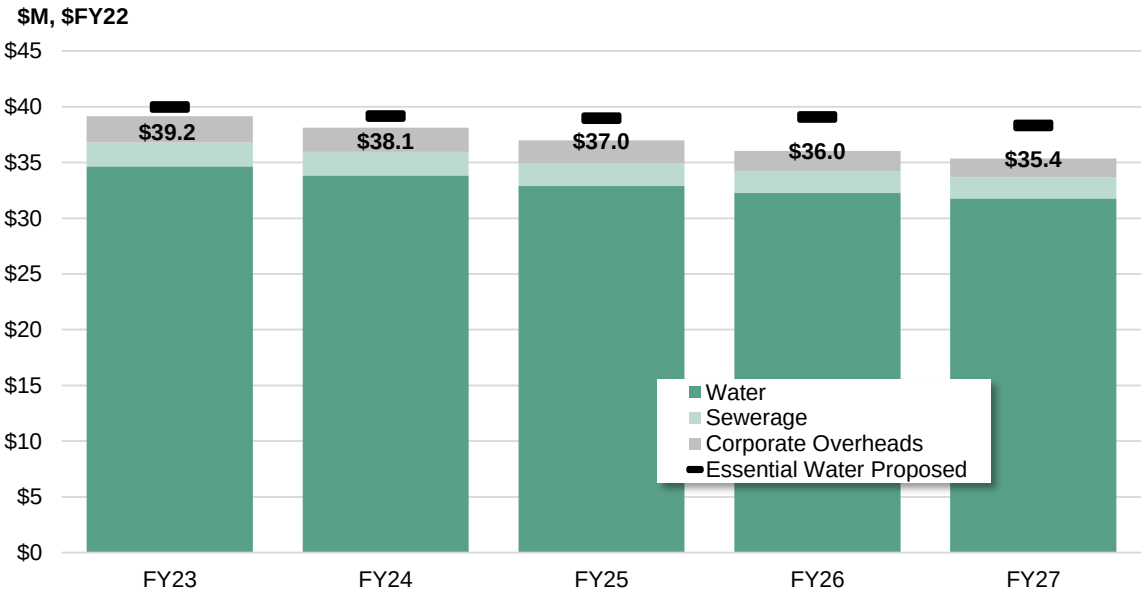

Figure 30 Essential Waters Operating Costs for the 2019 Determination Period ($ Million, $FY22)

6.3 Comparison to Similar Utilities

This section presents a comparison of Essential Water against similarly sized utilities (with 10,000 - 20,000 connected properties) throughout Australia, for several metrics relating to cost efficiency and service standards. Benchmark data was obtained from the 2019–20 National Performance Report published by the Bureau of Meteorology (BOM).

Figure 31 provides a comparison of operating cost per property for both water supply and wastewater between Essential Water and similar utilities. Essential Water's operating cost per property is consistently higher compared to similar utilities.

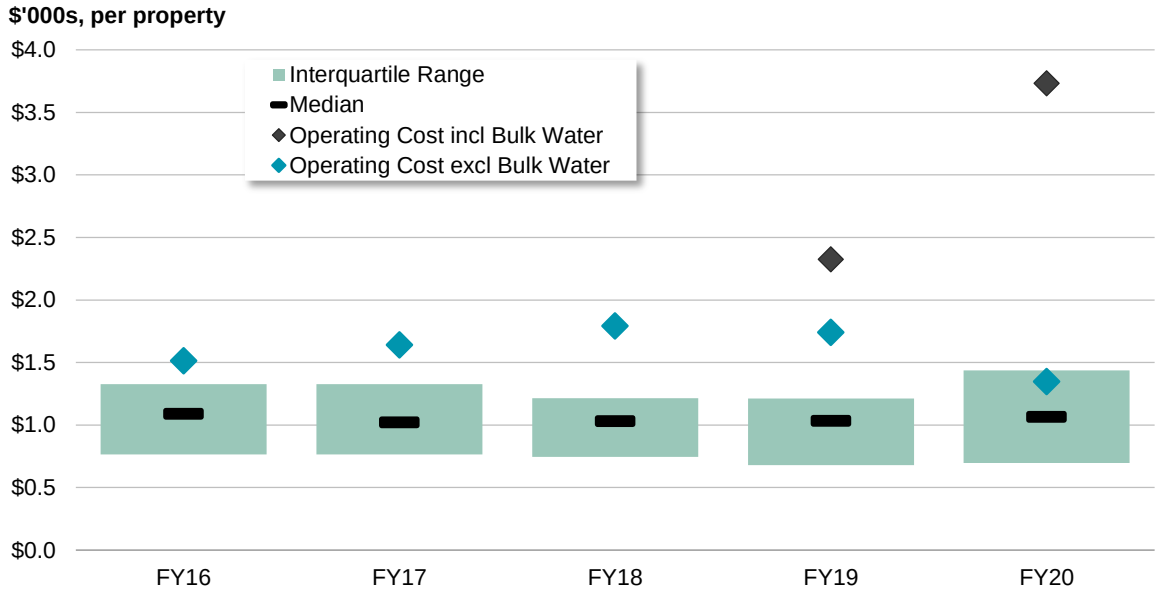

Figure 31 Combined Operating Cost (Nominal) per Property: Water Supply and Wastewater[9]

Figure 32 provides the number of complaints associated with water and sewerage that was filed between FY12-20. Essential Water has had consistently lower number of complaints for water and sewerage compared with similar utilities. This, when considered in conjuncture with Figure 31, could indicate that Essential Water are overspending to deliver a higher-than average standard of service. However, additional performance metrics need be considered.

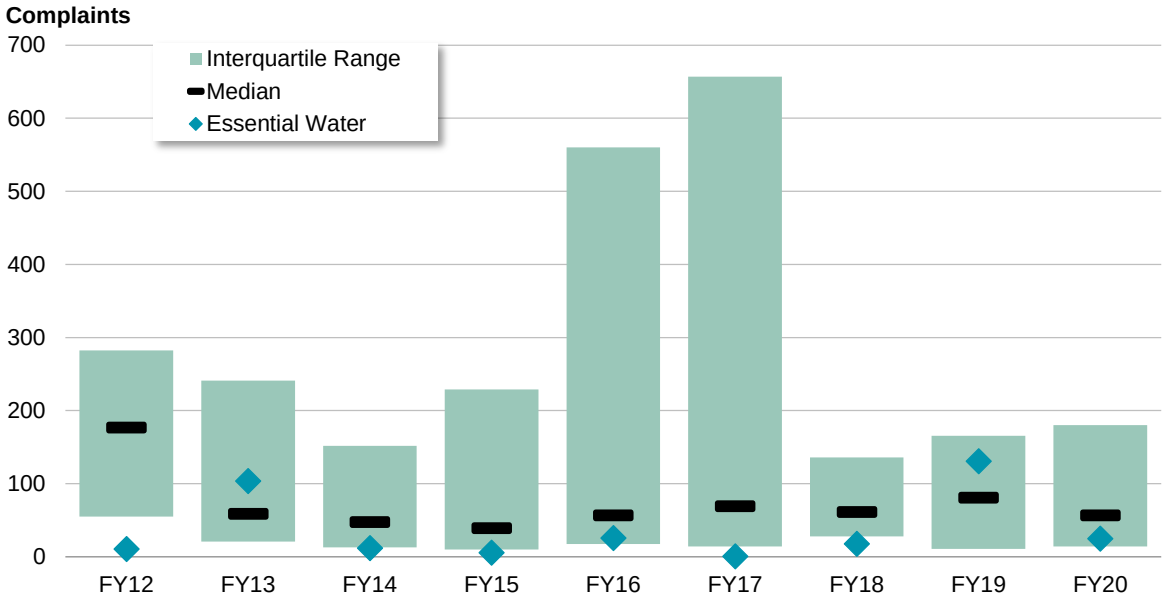

Figure 32 Number of Water and Sewerage Complaints

Figure 33 provides the number of water main breaks per 100 km of water mains. Essential Water has a consistently higher than average number of water main breaks when compared with similar utilities. This is consistent with the high degree of reactive maintenance reported by Essential Water (refer Section 6.1.3).

[9] Data for the number of connected properties (water supply) for year 2016-17 was not available, however, as the number of connected properties (water supply) remained at ~10,500 in years 2015-16 and 2017-18, it is assumed that 10,500 properties were connected in 2016-17.

This may lend support to Essential Waters claim of incurring additional operating labour costs to address mains breaks, however the rate of failure does not appear to be consistently increasing over time. This does though lend support to the proposed program of water main replacement and refurbishment works (Section 7.3).

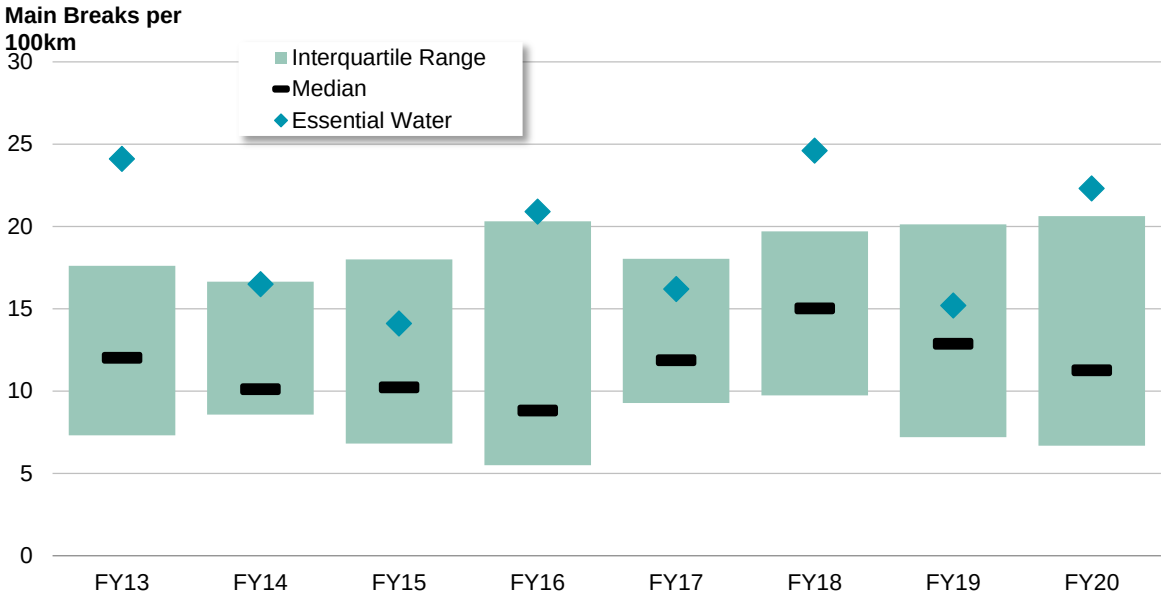

Figure 33 Number of Water Main Breaks, Bursts, and Leaks, per 100 km of Water Mains

Essential water has a substantially higher than average number of sewer main breaks and chokes per 100 km of sewer mains, as highlighted in Figure 34. As for water mains, this lends support to the proposed program of sewer main replacement and refurbishment works (Section 7.3).

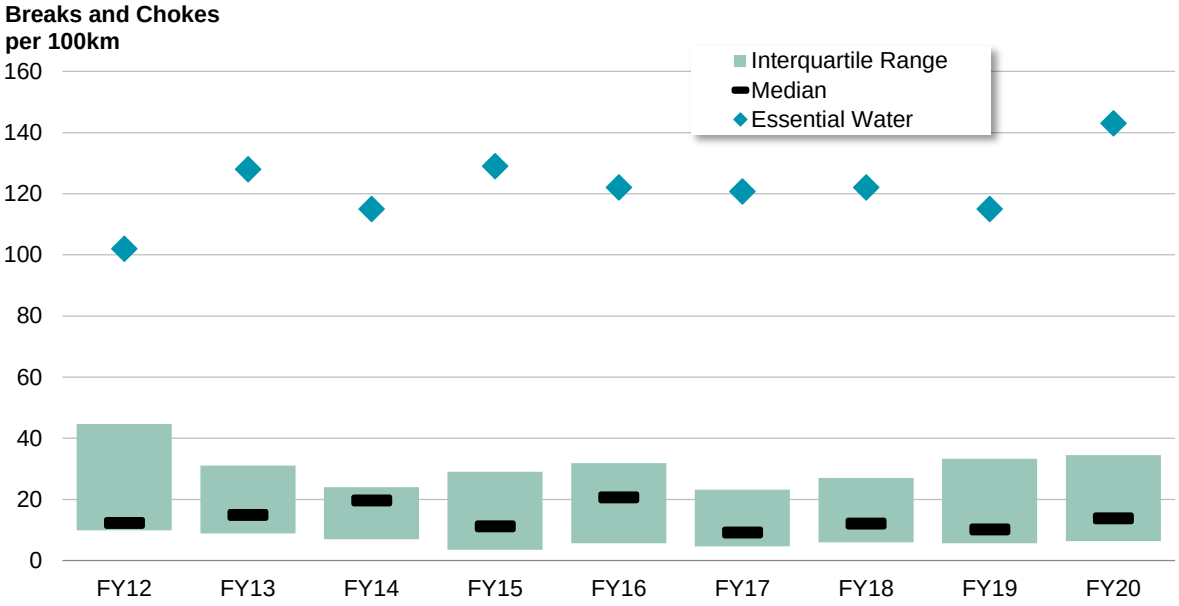

Figure 34 Number of Sewer Mains Breaks and Chokes per 100 km

The infrastructure leakage index provides a performance indicator of real/physical water losses from a supply network of water distribution systems. It indicates how well a distribution network is managed. As shown in Figure 35, the infrastructure leakage index for Essential Water is relatively comparable to similar utilities.

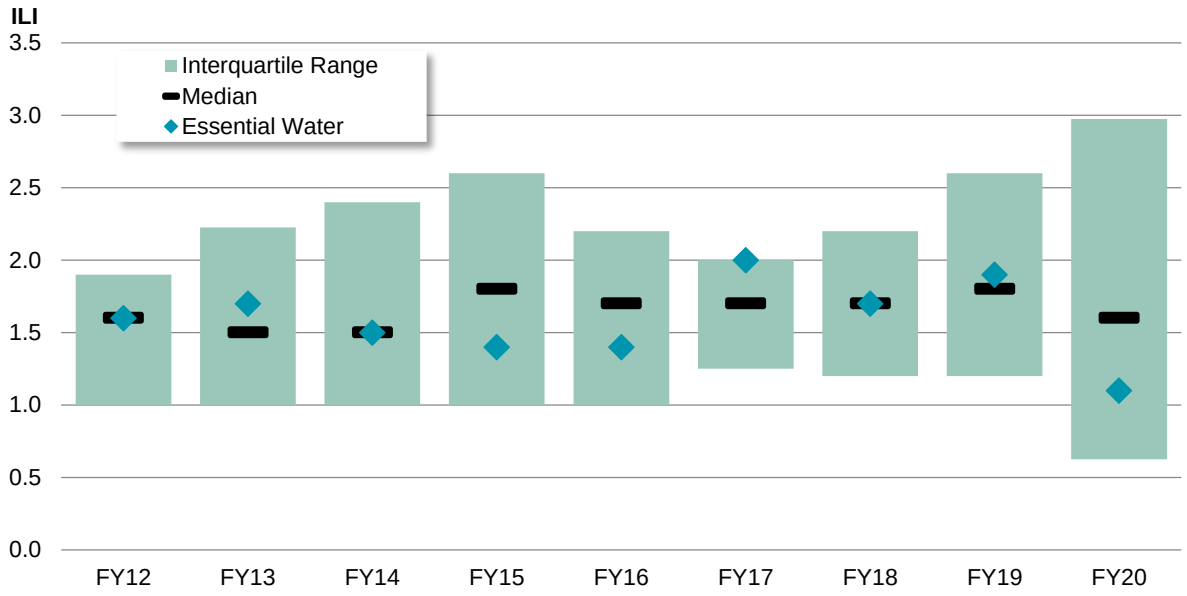

Figure 35 Infrastructure Leakage Index (ILI)

7. Review of Capital Expenditure

In this section we review the historical and projected capital expenditure.

7.1 Summary of Findings

We reviewed the information made available on the capital expenditure for the previous determination period and the 2022 Determination Period, and made the following observations:

- The capital expenditure for the 2019 Determination Period was less than the allowed amount from the IPART Determination. The main reasons for this underspend were the savings realised through the Brine Pond Decommissioning, and the delay in expenditure for the Wills St WWTP.
- There is a significant spike in expected capital expenditure in FY22 in comparison to the two previous years.
- The Brine Pond Decommissioning project was reviewed in detail, and we consider the project to be efficient. The project was delivered for costs well within pre-tender estimates.
- A significant program of works is proposed for the 2022 Determination Period. To support our review, business cases were provided. Most projects in the sample demonstrate a clear cost driver and cost efficiency.
- The Wills St WWTP project business case was reviewed in detail. The level of detail provided in the business case with regards to cost, risk and concept designs is lower than what would be expected for a project with an estimated capital value of ~$30 million. The contingency and indirect cost allowances in the cost estimate generally appear to be too low. With the information provided, we do not consider the costs for the project to be prudent or reliable due to the limited level of detail in the business case.
- We do not consider the expenditure for the Mica St WTP Concrete Remediation project to be efficient. Our review of the available information found that there does not appear to be urgency in the project. An allowance for monitoring of degradation has instead been proposed as efficient expenditure.
- In general, the business cases presented include the elements that would typically be expected. We have, however, identified several issues:
  - Some business cases include an allowance for overheads – this appears to also be allocated separately based on direct costs, presenting a risk of double counting.
  - The business cases typically reference documents that are over five years old to demonstrate project need.
  - Source and accuracy of cost estimates is not generally provided. This is particularly critical for the Gate 3 Business cases.
  - Project risks should be documented within the business case.

7.2 Historical Capital Expenditure - 2019 Determination Period

Essential Water's capital expenditure over the 2019 Determination Period is discussed at Section 1.5.1, and is shown again in Table 34.

Table 34. Capital Expenditure Over the 2019 Determination Period ($ Millions, Nominal)

Actuals	FY20	FY21	FY22	Total
Non system	$2.03	$1.14	$2.24	**$5.41**
Water	$7.03	$6.03	$17.51	**$30.57**
Sewerage	$0.64	$1.23	$2.12	**$3.98**
Corporate Overheads	$0.77	$1.34	$6.17	**$8.28**
Total	**$10.48**	**$9.74**	**$28.03**	**$48.25**
IPART Allowance	$26.51	$12.42	$14.89	**$53.81**
EW Proposed	$15.37	$21.77	$19.47	**$56.60**

The two main reasons that expenditure is lower than the IPART allowances are:

- Deferral of the *Wills Street Wastewater Treatment Plant* to the 2022 Determination, with only $1.0 million incurred in the 2019 Determination Period.

- Lower than expected costs for the *Decommissioning the Desalination Plant Brine Pond*, with actual costs of $3.5 million.

Both projects are included in the review sample (with the review of the *Wills Street Wastewater Treatment Plant* provided at Section 7.3).

7.2.1 Brine Pond Decommissioning

Project Overview

A brine disposal system (brine transfer pipeline to a brine pond) was part of the emergency water supply system for Broken Hill, brought about as a result of ongoing water supply security concerns and increases in salinity in Broken Hill's primary water sources. The brine pond was located on borrowed land at the Perilya Mine site in Broken Hill.

With the introduction of the Broken Hill Pipeline, the Brine Pond serving the Broken Hill Water Supply is no longer required, leading Essential Water to look to decommission the brine pond and return the land to Perilya Limited. The decommissioning had a target date of 25 August 2020, when the Crown Land License was due to expire.

The scope of work required to decommission the brine pond is as follows:

- Dewatering the brine pond by natural and mechanical means
- Removal of the salt and liners to EPA standards
- Decommissioning the remainder of the infrastructure to either salvage for the client or the approved waste facility
- Leave the existing decontaminated infrastructure in place for future alternate use by Perilya Limited (limited to the outer wall and earthworks).

Efficiency Considerations

A summary of the efficiency considerations for this project is provided in Table 35.

Table 35 Efficiency Considerations – Brine Pond Decommissioning

Efficiency Consideration	Comment
Customer needs, subject to the utility's regulatory requirements	The major driver for the decommissioning of the brine pond was the reduced need for water security through reverse osmosis plants due to increased rainfall and the commissioning of the Broken Hill Pipeline. Prior to the pipeline coming online, there was a need for emergency water supply systems to be in place to ensure water security at Broken Hill under conditions of drought. With the introduction of the pipeline, customer needs for water supply were being met through the increased security provided by the pipeline. In addition, the brine pond was located on borrowed land at the Perilya Mine site, through a Crown Land licensing agreement which was due to expire on 25 August 2020. A Memorandum of Understanding (MoU) between the two parties showed that there was a clear need to return the land to Perilya Limited by this date.
Customer preferences for service levels, including customers' willingness to pay	For customers of Essential Water, the decommissioning of the brine pond represents a change in the way that Essential Water delivers water security and addresses water supply service levels. Given the pipeline provides water security, continued operation of the brine pond would be inefficient. In addition, there was an obligation to return the land to Perilya Limited.
Trade-offs between operating and capital expenditure, where relevant	This project involved decommissioning of an existing asset. Operating costs for the project will be reduced to nil once decommissioned, so the capital cost is the key consideration.
The utility's capacity to deliver planned expenditure	This is a completed project delivered through a contractor, demonstrating capacity to deliver the project. However, the project does appear to have exceeded the target date of 25 August 2020, with a Notice of Actual Completion dated 5 February 2021.
The utility's expenditure planning and decision-making processes	The costs being claimed for the project are below the allowance provided by IPART in the 2019 Determination. AECOM has made the following findings relating to expenditure planning: **Procurement** A Tender Recommendation Report delivered by Public Works Advisory outlined the procurement process and tender assessment details for delivery of the decommissioning: • One conforming tender was received for a tender amount of just under $2.6 million, significantly lower than the pre-tender estimate of $6 million. Because the amount was significantly lower (more than 10%) of the pre-tender estate, the tenderer confirmed in

Efficiency Consideration	Comment
	writing that it fully understood the nature and extent of the contract work. The lower cost was due to the closer proximity of the landfill facility selected and the local nature of the tenderer. • The Report demonstrated that the Tender Evaluation Review Process was followed for this project, with assessments performed on price and other assessment criteria. As there was only one tenderer, this was not a competitive process (which can be indicative of an efficient cost), however it appears that checks were put in place to confirm that the tenderer had the skills and capacity to deliver the project, and the tendered price was below the pre-tender estimate. **Liner Disposal** AECOM noted during its review that $0.37 million in costs have been included for liner disposal, when the business case stated that there may be interest from Perilya Limited in reusing the liner. Further discussion was had with Essential Water over this issue and a summary is provided below. The liner for the brine pond was over 13 hectares of plastic. Essential Water has explained that when the business case was being developed, there were significant disposal costs estimated for the liner due to the disposal location being 450 km away from the site. During discussions, Perilya expressed an interest in reuse of the liner if it is in useable condition. Since the initial discussions, works were undertaken and parts of the liner have become damaged. Essential Water has stated that Perilya did agree to keep the liner, but would cut it down into useable pieces, and that no costs have been expended on disposal of the liner so far. However, the Detailed Contract Valuation suggests expenditure incurred of $0.37 million. It notes uncertainty in discussions with Perilya over the extent of what can/will be retained. It appears that due to damage to the liner during decommissioning, the entirety of the liner would not be suitable for reuse, and so it would be reasonable to assume that some costs may be incurred for disposal of the liner. **Review of Environmental Factors** Environmental factors were considered for the project through a Review of Environmental Factors, which determined that the proposed activity would not require an Environmental Impact Statement, Species Impact Statement, and would not significantly affect any Matters of National Environmental Significance. **Contingency and Variations** There is a discrepancy in the project contingency noted in the *Variation Register* ($2.77 million) and the 20% contingency noted in the comparison between the pre-tender estimate and contracted amount ($0.51 million), the reasons for which are unclear. The Variation Register shows requests for variation totalling $1.26 million, with the total approved at $0.66 million.
Project Scope	The Gate 3 Approval document outlines a clear consideration for different options for brine management, salt disposal, water disposal and liner removal, which are presented technically, and costs broken down, in the *Broken Hill Works Technical Advice – Brine Pond Decommissioning* document (WSR18012 – March 2018) delivered by Public Works Advisory. The selected option – solar evaporation of brine with sweeping of dried brine – was the lowest cost option by a significant margin.
Alignment with Standards	An assessment provide in the PWA Technical report includes consideration for legislation and waste code.

Findings

There were clear cost drivers for the project, being the MoU between Essential Water and Perilya stating that the brine pond will be decommissioned by 2020, and the removal of the need for the brine pond given the decommissioning of the Reverse Osmosis plants, and the introduction of the pipeline to ensure water security.

The project considered the relevant legislation and disposal requirements including the requirements of the EPA, and where available, investigated opportunities for reuse instead of disposal.

While there was only a single tenderer for the project, the remote location of the project means that this would not be entirely unexpected. The tenderer provided value for money, with a contract value 57% less than the pre-tender estimate.

The most significant driver for this lower cost was the removal and disposal of salt, where the tenderer's rate was 20% of the estimated rate, for a saving of around $4 million. The solution from the tenderer was found to be a suitable alternative, and the tenderer appeared to be properly vetted through the Tender Evaluation Process. Essential Water included a contingency amount of approximately $0.5 million on top of the contracted price to account for any unforeseen costs/risks. As the salt removal process was proposed to occur over the October to March period, any unusual summer storm event could have delayed the brine drying process or re-wetting of the dried salt mounds resulting in some abortive effort and additional standby time leading to additional costs.

We considered the contingency included to reasonably cover this cost; however, the approved variation amounts for the project exceed this value as demonstrated in the Variation Register, which also states the contingency to be much higher than the 20% estimated (at $2.76 million).

The Variation Register suggests that the contract appears to have been managed prudently, with approximately half of the variations proposed accepted. The total incurred costs of $3.5 million are below the IPART allowance and below the pre-tender estimates for the project.

Based on a review of the documents provided, AECOM considers that expenditure on this project is efficient. The quality of documentation available to base our review is assessed as high.

7.2.2 Review Findings

Table 36 presents a summary of the historical project sample review. No adjustments are proposed to Essential Waters direct capital costs.

Table 36 Summary of Sampled Projects

2019 Determination Period		Efficient?		
Project	**Total ($ million, actual)**	**Technical Review**	**Cost Review**	**Recommended Adjustment ($ million, actual)**
Decommissioning the desalination plant brine pool	$3.50	✓	✓	$0.00
Total Sampled	**$3.50**			**$0.00**

Table 37 presents a summary of the recommended capital costs, including the corporate overhead adjustment outlined at Section 5.4.

Table 37 Recommended Capital Costs ($ Millions, Nominal)

	FY20	FY21	FY22
Essential Water Costs			
Non system	$2.03	$1.14	$2.24
Water	$7.03	$6.03	$17.51
Sewerage	$0.64	$1.23	$2.12
Corporate Overheads	$0.77	$1.34	$6.17
Total	**$10.48**	**$9.74**	**$28.03**
AECOM Recommended Adjustments			
Non system			
Water			
Sewerage			
Corporate Overheads			-$2.29
Total	**$0.00**	**$0.00**	**-$2.29**
Efficient Costs			
Non system	$2.03	$1.14	$2.24
Water	$7.03	$6.03	$17.51
Sewerage	$0.64	$1.23	$2.12
Corporate Overheads	$0.77	$1.34	$3.88
Total	**$10.48**	**$9.74**	**$25.74**

This is represented graphically in Figure 36, where the stacked bars are AECOM recommended costs and the black markers represent Essential Waters costs.

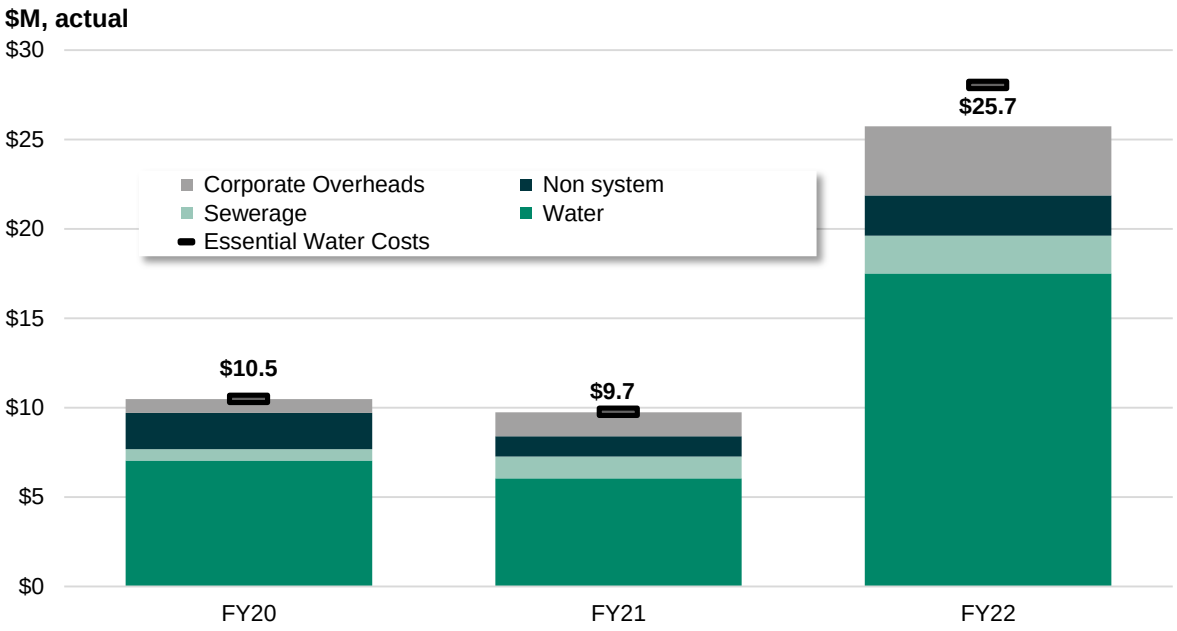

Figure 36 Recommended Capital Costs ($ Millions, Nominal)

7.2.3 Project Delays

Essential Water has identified that some projects allowed for in the 2019 Determination Period may not be delivered, and costs may spill over into the 2022 Determination Period. In particular, delays are anticipated for the Graziers Pipeline, for which community consultations are yet to be undertaken. On this basis, a high level reprofiling of the recommended efficient costs presented at Section 7.2.2 has been undertaken, with 25% of the allowed expenditure being included in FY22, and 50% deferred to FY23 and 25% to FY24. Table 38 presents the outcomes of this indicative assessment. The forward costs are presented at Section 7.3.4.

Table 38 Reprofiled Capital Costs ($ Millions, Nominal)

	FY20	FY21	FY22
Efficient Costs			
Non system	$2.03	$1.14	$2.24
Water	$7.03	$6.03	$17.51
Sewerage	$0.64	$1.23	$2.12
Corporate Overheads	$0.77	$1.34	$3.88
Total	**$10.48**	**$9.74**	**$25.74**
Reprofiling Adjustments			
Non system			
Water			-$8.95
Sewerage			
Corporate Overheads			-$1.35
Total	**$0.00**	**$0.00**	**-$10.29**
Reprofiled Costs			
Non system	$2.03	$1.14	$2.24
Water	$7.03	$6.03	$8.56
Sewerage	$0.64	$1.23	$2.12
Corporate Overheads	$0.77	$1.34	$2.53
Total	**$10.48**	**$9.74**	**$15.45**

7.3 Proposed Capital Expenditure - 2022 Determination Period

Essential Water proposes $75.0 million in capital costs over the 2022 Determination Period, including direct project costs of $65.1 million and corporate overheads of $9.9 million. Essential Water in its submission notes that corporate overheads (following direct application of the CAM) are estimated at $17.5 million, and that the adjusted cost allocation methodology (outlined at Section 5.3.2) resulted in $7.6 million reduction to this.

Table 39 provides a list of major projects associated with the planned capital expenditure over the determination period. The projects in the scope of this review are denoted by green highlighting (with darker highlighting used to indicate high-cost projects).

Table 39 Planned Capital Expenditure over 2022 Determination Period

Project	Start Year	Finish Year	Total ($millions, $FY22)	% Direct Cost
Wills Street Wastewater Treatment Plant Replacement	***2021***	***2025***	***$29.90***	***46%***
Broken Hill Water and Sewer reticulation repair and replacement	***2022***	***2027***	***$10.70***	***16%***
Non-system asset expenditure: Information Technology	2022	2023	$3.50	5%
Mica Street Service Reservoir Replacement	2021	2023	$3.10	5%
Mica Street Water Treatment Plant Concrete Remediation	2018	2023	$2.50	4%
Non-system asset expenditure: Motor vehicles	2022	2023	$1.90	3%
Rocky Hill Service Reservoir Refurbishment and Replacement	2023	2024	$1.90	3%
Non-system asset expenditure: Buildings	2022	2023	$0.40	1%
Non-system asset expenditure: Furniture, Fittings, Plant and Equipment	2022	2023	$0.20	0%
Other water and sewerage	*2023*	*2027*	*$11.00*	*17%*
Total Capital Expenditure, Excluding Overheads			**$65.10**	
Corporate Overheads			$9.92	
Total			**$75.02**	

The projects in the review sample amount to 83% of the total direct capital expenditure. The Wills Street WWTP Replacement and Broken Hill Water and Sewer Reticulation Repair and Replacement projects are the most significant (by value), amounting to 46% and 16% of the total direct capital expenditure respectively. These projects are reviewed in detail, with a summary level assessment undertaken for the other sampled projects.

7.3.1 Wills Street Wastewater Treatment Plant Replacement

Project Overview

There are two WWTP in Broken Hill which treat domestic and commercial effluent:

- Wills Street WWTP – which was commissioned in 1939, and upgraded in the 1950s and the 1980s,
- South Broken Hill WWTP (South WWTP) – which was built in the 1960s.

The Will Street WWTP and South Broken Hill WWTP are currently operating under the NSW EPA Environment Protection Licences (EPL) No. 3925 and 5067 respectively. The EPA have issued an Environmental Improvement Plan (EIP) - attached to the Wills St EPA Licence - that will require discharges to meet a new set of discharge parameters and concentration limits. Essential Water has presented data that shows it will be in breach of EPA requirements unless the plant capability is upgraded.

The proposed solution is to upgrade treatment capability to deliver compliance with EPA requirements. The options for delivering this are presented in the Wills St Business Case, and the preferred option is nominated as - *Decommission South WWTP and transfer its sewage to a new Wills St WWTP*. The major benefits of the project are noted as:

- Maintain compliance with the Wills St WWTP discharge licence requirements
- Reduced operating costs by decommissioning South WWTP
- Reduced annual maintenance of Wills St WWTP
- Improved work health and safety conditions for operators and visitor to the WWTP
- Increased beneficial reuse of treated effluent leading to reduced reliance on potable water for irrigated park lands and golf course.

The total proposed cost for the project is $30.9 million, with $29.9 expected to be incurred within the 2022 Determination Period.

Efficiency Considerations

We comment on the efficiency considerations in Table 40.

Table 40 Efficiency Considerations – Wills St WWTP

Efficiency Consideration	Comment
Customer needs, subject to the utility's regulatory requirements	The major driver for the project is to meet new EPA requirements, which the existing WWTPs do not have the capability of delivering. Data supports this stipulation, which presents a clear compliance risk, and it is reasonable to address this. The previous determination recommended deferring the project, however recently updated EPA requirements, and the age of the existing plants, suggest that the timing proposed for the project is reasonable.
Trade-offs between operating and capital expenditure, where relevant	Operating costs have been outlined and considered in the business case, with net present costs included in the assessment. The business case notes that expected benefits of the project are reduced operating costs at South WWTP (due to it being decommissioned) and reduced operating costs at Wills St WWTP due to the increased efficiency of the plant. These savings do not appear to have been quantified and included in the cost projections or compared against a base case.
The utility's capacity to deliver planned expenditure	Essential Water is confident that the project can be delivered on time and on budget by relying on external service providers. Procurement is proposed to be undertaken in two phases: • Planning Phase – where suitably qualified consultants will be engaged. • Design and Construct Phase – based on information provided in a Jacobs report, D&C is the proposed procurement method. While the remote location of the proposed WWTP may generally limit tenderers, the size of the contract may attract sufficient attention of leading contractors, which may limit the risk of failure to deliver.
The utility's expenditure planning and decision-making processes	The costs proposed for the project total $30.9 million, with $1.0 million falling in the present determination period, and the remainder proposed for the 2022 Determination Period. More information will be sought on the proposed costs, as these are difficult to reconcile within the business case. **Procurement** While procurement information is included in the business case, Essential Water has advised that procurement for the project will be in two phases – detailed design and then construction. This will allow them to consider and mitigate risks in the detailed design phase before committing to construction costs. **Risks** Three risks are included in the summary of key risks in the business case. These are summarised at a relatively high level, and we would expect that at final business case stage, a more detailed risk assessment would be undertaken to inform cost estimates. We note that the project involves the consolidation of two WWTPs into one. The scope appears to be developed based on the assumption that the effluent quality is the same at each plant, and no allowance has been made for consolidation of the two waste streams. We consider this to be an additional risk to the project.
Project Scope	The project scope, as outlined in the business case, shows a single plant designed for a hydraulic load of 200 L/EP/day. This assumption is based off an assumed expected increase in water usage of 25% from numbers recorded in 2018 (160 L/EP/day). The basis for the assumed increase was an expected behavioural change in water usage due to the increased availability of water from the pipeline, due to come online in 2019. The IWCMS estimated that this increase may be more in the order of 5%, however the previous (higher) estimated increase appears to have provided the basis for the design/costs. In comparison with earlier estimates, water usage per household may not be expected to increase as significantly, potentially due to the declining population and water efficiency measures influencing ongoing behaviour. This suggests that the capacity for the WWTP may be overestimated. This is listed in the business case as a key risk, with mitigation measures suggesting that a review of demand be undertaken during the detailed design phase.
Alignment with Standards	While the business case does not appear to include concept designs for review against engineering standards, it provides details on how the project strategically aligns with the EP&A Act, the Restart NSW – Safe and Secure Water Program, and the IWCMS 2021-2051 document. Most importantly, the preferred solution should allow them to meet the licence requirements as outlined by the EPA.
Cost Estimates	The cost estimates in the business case are nominated as pre-design concept stage cost estimates. Following further review and discussion with Essential Water and its consultant for the business case, we identified the following findings regarding costs estimates: • Construction cost estimates are provided at Appendix C of the Concept Design Report for the project, delivered in 2019. The business case does appear to show some discrepancies in costs; however, we have been advised that the concept design construction cost estimate has informed costs proposed. • Basis of costs are largely identified as allowances, suggesting a high-level estimate of costs. • For the high-level nature of the estimates, a contingency allowance of 15% and an additional 5% for remoteness of location appears low. AECOM would typically expect a cost estimate at this stage in the decision-making process to be accurate to P90 and likely to require a contingency allowance more in the order of 30-40%. The risks outlined in the business case would all have cost impacts and contingency should account for these and any additional identified risks. This is likely to substantially increase the cost estimate for the project.

Efficiency Consideration	Comment
	• Investigation and design fees are estimated at 4% of construction costs. For a project of this nature, we would expect these to be in the order of 5-7%. It is recommended that a more detailed cost estimate is developed for the project prior to proceeding, with contingency informed by detailed risk analysis.

Review Findings

There is a clear regulatory driver for the new Wills Street WWTP in that significant upgrades are required to address the requirements set by the EPA. We consider that the timing for the project is appropriate, and the proposed solution is acceptable, supported by an options report delivered by GHD.

The scope of the preferred solution appears to be based on assumptions of significant increases in water usage brought about by the improved water security provided by the new pipeline. This appears to be inconsistent with the downward usage trend per household (as noted in the IPART issues paper) and may suggest that the proposed plant is oversized. However, we understand that the recent lift of water restrictions may result in behavioural changes and potentially increase demand and usage. Changes to demand is noted as a risk in the business case, with the mitigation suggested as a review for demand changes during the detailed design phase.

The level of detail provided in the business case with regards to cost and risk is lower than what would be expected for a project with an estimated capital value of ~$30 million.

The contingency and indirect cost allowances in the cost estimate generally appear to be too low. With the information provided, we do not consider the costs for the project to be reliable due to the limited level of detail provided in the business case. The cost estimates appear to be informed by concept designs, with basis for costs largely identified as allowances. These costs were produced in 2019, and we would expect that the business case would reflect more up to date costs.

Given the clear regulatory driver for the project, we consider that the project costs are reasonable for inclusion in the 2022 Determination Period, however, note the risk that project costs may exceed the estimates due to the level of detail in cost estimates, and lower than expected contingency allowances that have not been informed by a detailed risk analysis. We recommend that IPART review this project in detail ex-post during the next pricing review.

The quality of documentation available upon which to base our review is assessed as medium.

7.3.2 Water and Sewer Reticulation Repair and Replacement

Project Overview

The Broken Hill Water reticulation system was built over a 30-year period starting in 1937. Asset effective lives for water mains are 80 years, and several the water mains in Broken Hill have or are reaching this threshold. To minimise the impact of having many water mains requiring replacement in any one financial year at a significant cost, Essential Water has an ongoing main replacement programme for several years. The proposed project is a continuation of this programme.

Until 2011, Essential Water had previously undertaken only reactive maintenance of the sewer reticulation system. Since 2011 Essential Water has continued with the sewer main inspection and relining program to reduce the number of mains and service blockages that occur. The condition of the system is steadily deteriorating with an increase in infiltration and inflows during storm events, and an ongoing main relining and replacement program is deemed essential.

Efficiency Considerations

We comment on the efficiency considerations for the project in Table 41.

Table 41 Efficiency Considerations – Water and Sewer Reticulation Repairs and Replacement

Efficiency Consideration	Comment
Customer needs, subject to the utility's regulatory requirements	The major driver for this project is management of risks to service levels. Asset deterioration due to end-of-life has been exhibited, and service delivery is being affected, as evidenced by the increased number of mains bursts that have occurred in recent years. The works were

Efficiency Consideration	Comment
	required to maintain standard of service to customers - including quality, reliability, and security of water/sewer services. For sewer reticulation, impacts to wet weather flows and condition assessment report documentation provided are commensurate with poor condition.
Customer preferences for service levels, including customers' willingness to pay	Customers have not been directly surveyed on this issue, however analysis of BOM data in Section 6.3 outlines that Essential Water is significantly exceeding other utilities in occurrences of main bursts and sewer bursts.
Trade-offs between operating and capital expenditure, where relevant	Operating costs have not been included within the business case; however, it can be assumed that repairs and replacements would improve the condition of the assets and reduce the need for reactive maintenance, therefore lowering operating costs.
The utility's capacity to deliver planned expenditure	This is an ongoing program of works. We will further investigate the capacity for delivery of this program.
The utility's expenditure planning and decision-making processes	AECOM has made the following findings relating to expenditure planning: **Delivery** In house resources are proposed to deliver these works and appear to have sufficient experience in this area. No consideration is given to checking market prices. The estimated cost appears to be within the acceptable range. **Contingency and Variations** Contingency has been allowed for and included in the estimate.
Project Scope	We consider that the proposed solutions are necessary and sufficiently efficient based on age of assets and predicted service life. The following improvements are noted: • Water: More investigations could be made into downward trend of main failures in the years leading to 2019 - which appears inconsistent with predicted service life. • Sewer: Consideration of other technologies may result in more efficient outcomes.
Alignment with Standards	The two programs of work appear to align with the relevant standard.

Review Findings

There is a clear cost driver for this project in that the age and condition of the assets is negatively affecting the provision of services, as demonstrated by higher than usual mains bursts and sewer bursts. The options considered for the project were appropriate and demonstrate prudency. While the lowest cost option was not selected, this was due to the unacceptable safety risks presented by the lower cost options.

Based on the information provided, we find the expenditure on this project to be efficient. The quality of documentation available upon which to base our review is assessed as medium.

7.3.3 Summary Level Projects

AECOM's review of the summary level projects is provided in Table 42.

Table 42 Summary Reviews

Project	Proposed Expenditure	AECOM Comment	AECOM Proposed Efficient Expenditure
Mica Street Water Treatment Plant Concrete Remediation	$2.5 million	AECOM does not consider this capital expenditure to be efficient. Mica St WTP was commissioned in 2010 and subsequent investigations have reported deterioration of the concrete surface due to the aggressive conditions. Essential Water has proposed to extend the service life of the structures through application of a protective coating. The CWT Concrete Repair Specification (dated 4 April 2019) specifies the use of a "*suitably resistant coating, e.g. solventless 2-pack epoxy*" but does not specify minimum performance requirements of the coating. Table 3.1 of the document specifies a design life of epoxy coatings on concrete to be only 10 years, such that replacement of the coating would potentially be required every 10 years. The Mahaffey Associations report (Mica St Broken Hill WTP – Review Repair Issued, dated 24 August 2021), proposes the use of a cementitious waterproofing mortar for a protective layer (Intercrete 4820 and 4841).	Allowance for Inspections once every two years ($0.1 million per inspection) - $0.3 million over the period. This is a scope adjustment.

Project	Proposed Expenditure	AECOM Comment	AECOM Proposed Efficient Expenditure
		No data is provided to support its suitability for use with wastewater and expected design life in this environment. The use of a cementitious product in this instance may not result in the optimum whole of life outcome. The example used to justify a 30-year life is not relevant to a WTP. This would need to be demonstrated and confirmed by the supplier in writing for the exposure conditions of this plant. There are several protective treatment products on the market that are specifically suitable for use in WTPs that could be used to provide a longer design life and therefore provide better whole-of-life outcomes. For example, epoxy novolac and polyurea based coating products could be considered. While we agree it is prudent to apply a concrete protection system to extend the long-term service life of concrete infrastructure exposed to aggressive conditions, the optimum timing of this preventative maintenance measure should be demonstrated by considering whole-of-life costs and risk. We note that the deterioration at this stage does not appear to have yet affected the structural integrity of the concrete infrastructure. Mahaffey's condition survey report (dated 12 October 2020) states that deterioration is only to a 2mm depth on the concrete surface due to leaching. The report does not indicate corrosion of the steel reinforcement. Rather, the report indicates that the steel reinforcement and concrete beyond the surface layer is in good condition. Based on only 2mm surface deterioration over 10 years, it appears that steel reinforcement is generally not at risk of corrosion in the short to medium term. Based on the information provided there appears to be no urgency in the application of a coating system, and we recommend on-going monitoring in general. Coating systems have a finite life in themselves and introduce additional maintenance requirements (and associated costs). If the coating system is applied in the next period, it would likely need to be replaced during the design life of the structures. A whole of life cost/risk assessment should be carried to determine the optimum timing of this maintenance solution in combination with an on-going monitoring program to monitor deterioration rates to support the proposal. Alternatively, the work can be carried out progressively in stages as on-going maintenance. We acknowledge that in the CWT Addendum to concrete repair specification (EMC1420-02-SPEC-A, dated 01/06/21), it has been reported that "*an inspection by Essential Water in March 2021 identified several cracks in the clarifier tank walls exhibiting staining from corroded steel reinforcement*". These defects were not raised or investigated previously by the specialist consultants and they appear to be unrelated to previously reported issues on surface leaching. The mechanism by which these cracks have occurred is unclear, the width of the cracks has not been reported and it has not been confirmed that the steel reinforcement is corroding. Water staining around very thin cracks is not an indication of steel reinforcement corrosion (it is possible these cracks occurred due to structural reasons). We recommend that the cracks in the clarifier tank walls be investigated for cause of cracking (as part of our recommended on-going monitoring) and, if required an appropriate remedial strategy be developed for these localised areas (which may involve crack injection in line with Section 2.12.4 of EMR1192-02-E-SPEC).	

Project	Proposed Expenditure	AECOM Comment	AECOM Proposed Efficient Expenditure
Mica Street Reservoir Replacement	$3.1 million	The Mica Street No. 1 Service Reservoir was constructed in 1892 and has exhibited structural issues. The Gate 2 Preliminary Approval Business Case has been provided for review. A supporting condition report from GHD has been provided and makes recommendations for some operational changes to the reservoir in order to slow further degradation. This was delivered in 2007, and it is unclear what works have been delivered in response to this. There appears to be a clear need to replace the existing reservoir given the noted poor condition, and the timing appears to be appropriate. A series of options were evaluated, and the alternatives considered were appropriate. The scope of the project includes the conversion of a decommissioned 3ML tank (No. 3 Service Reservoir) to replace the No. 1 Service Reservoir. An options review has been undertaken and the least cost option that can achieve the objectives of the project was selected. We consider the project to be prudent, and expenditure to be efficient.	$3.1 million
Rocky Hill Service Reservoir Replacements	$1.9 million	We have reviewed the Gate 2 Preliminary Approval Business Case (2018) for the Rocky Hill Service Reservoir. The business case demonstrates that there is a clear need for an additional tank to allow the existing reservoir to be taken offline for rectification and recoating works. The business case showed a clear consideration for different options and the alternatives presented were appropriate in scope. Options were reviewed in terms of their ability to meet the objectives, capital and operating costs. The second lowest cost option was selected, as the lowest cost presented unacceptable risk. The scope, delivery methodology and standard for the project appear to be prudent. Costs for the project appear higher in the business case than what is requested in the pricing proposal. This may be due to expenditure in the 2019 Determination Period.	$1.9 million
Non-System Asset Expenditure	$6.0 million	Non-system Asset Expenditure is a support cost associated with provided Network Infrastructure. This expenditure is allocated, and based primarily on Essential Energy's parent company information, but adjusted to be more reflective of Essential Water direct costs where possible. The adjustments applied has resulted in substantially lower levels of non-system capital expenditure being allocated to Essential Water. Essential Water has advised that a direct application of the CAM would result in an allocation of 2.61% to Essential Water's non-system capital expenditure, however it notes that reductions have been applied to better reflect direct costs incurred by Essential Water: • IT – 33% • Fleet – 56% • Property – 76% • FFPE – 68% These are significant reductions and appear to represent a commitment to reducing Essential Water costs. The non-system asset expenditure is lower than the previous Determination Period on average. A spike in costs can be seen for ICT costs, which can be attributed to corporate transformation programs introduced at Essential Energy. We consider these costs to be efficient.	$6.0 million

Project	Proposed Expenditure	AECOM Comment	AECOM Proposed Efficient Expenditure
Corporate Overheads	$9.9 million	Corporate overheads are assigned to reflect the proportion of corporate operating costs that support capital projects. These are allocated in accordance with the CAM. We have proposed some reductions in the proposed efficient costs for the 2022 Determination period, and as a result, we would expect to see corporate overheads reduced by a proportionate amount.	Adjustment provided in Section 5.4

A summary of the recommend efficient expenditure for the 2019 and 2022 Determination Periods is presented at Table 43.

7.3.4 Review Findings

Table 43 presents a summary of the forward project sample review. A total adjustment of $2.20 million has been proposed to Essential Waters direct capital costs.

Table 43 Summary of Sampled Projects

2022 Determination Period		Efficient?		
Project	Total ($millions, $FY22)	Technical Review	Cost Review	Recommended Adjustment ($millions, $FY22)
Wills Street Wastewater Treatment Plant Replacement	$29.90	✔	✘	$0.00
Broken Hill Water and Sewer reticulation repair and replacement	$10.70	✔	✔	$0.00
Mica Street Service Reservoir Replacement	$3.10	✔	✔	$0.00
Mica Street Water Treatment Plant Concrete Remediation	$2.50	✘	✘	-$2.20
Non-system asset expenditure	$6.00	✔	✔	$0.00
Rocky Hill Service Reservoir Refurbishment and Replacement	$1.90	✔	✔	$0.00
Total Sampled	**$54.10**			**-$2.20**

Table 44 presents a summary of the recommended capital costs, encompassing the direct cost adjustments and the resultant adjustment on allocated corporate overhead costs. The recommended capital costs are shown prior to and including application of the continuing efficiency adjustment.

Table 44 Recommended Efficient Expenditure ($ Millions, FY22)

	FY23	FY24	FY25	FY26	FY27
Essential Water Proposed					
Non system	$1.94	$1.48	$0.85	$0.86	$0.86
Water	$4.50	$3.53	$4.03	$3.75	$3.82
Sewerage	$12.83	$14.25	$9.56	$1.45	$1.39
Corporate Overheads	$2.98	$3.16	$2.22	$0.81	$0.75
Total	**$22.25**	**$22.43**	**$16.66**	**$6.87**	**$6.81**
AECOM Recommended Adjustments					
Non system					
Water	-$2.40		$0.10		$0.10
Sewerage					
Corporate Overheads	-$0.41		$0.02		$0.01
Total	**-$2.81**	**$0.00**	**$0.12**	**$0.00**	**$0.11**
Efficient Costs					
Non system	$1.94	$1.48	$0.85	$0.86	$0.86
Water	$2.10	$3.53	$4.13	$3.75	$3.92
Sewerage	$12.83	$14.25	$9.56	$1.45	$1.39
Corporate Overheads	$2.57	$3.16	$2.24	$0.81	$0.76
Total	**$19.44**	**$22.43**	**$16.78**	**$6.87**	**$6.93**
Efficient Costs, Including Continuing Efficiency Adjustment					
Non system	$1.93	$1.46	$0.84	$0.83	$0.83
Water	$2.09	$3.49	$4.04	$3.64	$3.78
Sewerage	$12.74	$14.05	$9.36	$1.41	$1.34
Corporate Overheads	$2.55	$3.12	$2.19	$0.79	$0.73
Total	**$19.30**	**$22.12**	**$16.43**	**$6.68**	**$6.69**

This is represented graphically in Figure 37, where the stacked bars (and reported totals) are AECOM recommended costs including the continuing efficiency adjustment, and the black markers represent Essential Waters proposed costs.

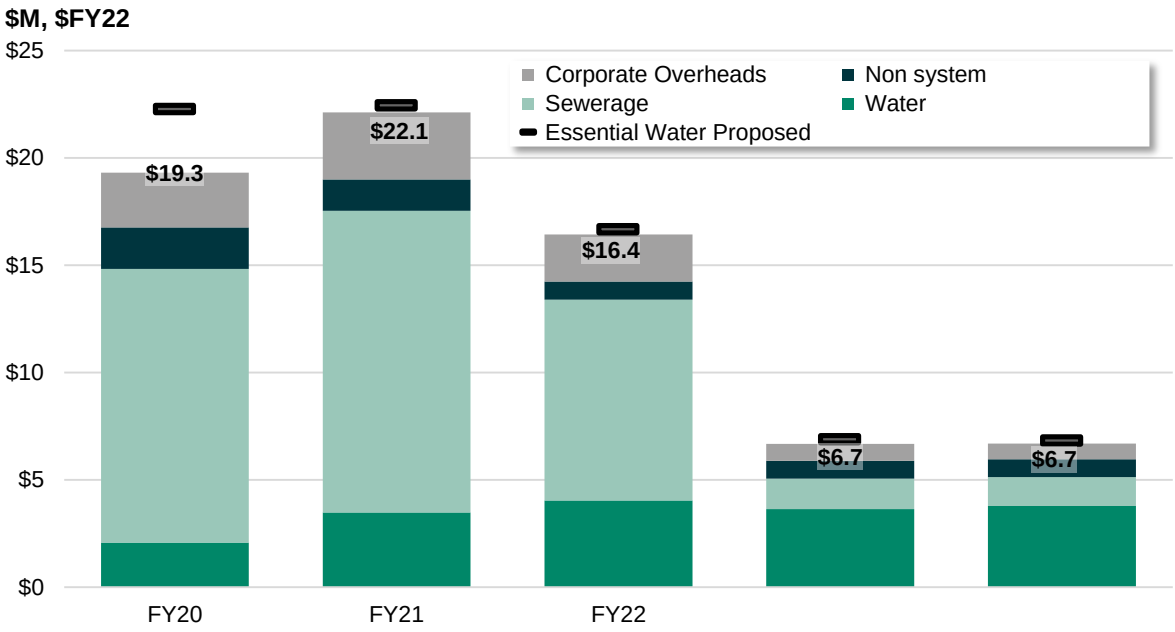

Figure 37 Recommended Efficient Expenditure ($ Millions, FY22)

The efficient costs including the deferral of costs associated with the Graziers Pipeline from FY22 (as part of the high level reprofiling outlined at Section 7.2.2) are presented in Table 45.

Table 45 Reprofiled Capital Costs ($ Millions, $FY22)

	FY23	FY24	FY25	FY26	FY27
Efficient Costs, Prior to Continuing Efficiency Adjustment					
Non system	$1.94	$1.48	$0.85	$0.86	$0.86
Water	$2.10	$3.53	$4.13	$3.75	$3.92
Sewerage	$12.83	$14.25	$9.56	$1.45	$1.39
Corporate Overheads	$2.57	$3.16	$2.24	$0.81	$0.76
Total	**$19.44**	**$22.43**	**$16.78**	**$6.87**	**$6.93**
Reprofiling Adjustments					
Non system					
Water	$5.96	$2.98			
Sewerage					
Corporate Overheads	$0.79	$0.42			
Total	**$6.75**	**$3.40**	**$0.00**	**$0.00**	**$0.00**
Reprofiled Costs					
Non system	$1.94	$1.48	$0.85	$0.86	$0.86
Water	$8.06	$6.52	$4.13	$3.75	$3.92
Sewerage	$12.83	$14.25	$9.56	$1.45	$1.39
Corporate Overheads	$3.35	$3.58	$2.24	$0.81	$0.76
Total	**$26.19**	**$25.83**	**$16.78**	**$6.87**	**$6.93**
Reprofiled Costs, Including Continuing Efficiency Adjustment					
Non system	$1.93	$1.46	$0.84	$0.83	$0.83
Water	$8.01	$6.43	$4.04	$3.64	$3.78
Sewerage	$12.74	$14.05	$9.36	$1.41	$1.34
Corporate Overheads	$3.33	$3.53	$2.19	$0.79	$0.73
Total	**$26.01**	**$25.47**	**$16.43**	**$6.68**	**$6.69**

8. Review of Output Measures

In this section we review the output measures currently used by Essential Water, its performance against them and assess how well the measures indicate performance against customer and regulator expectations.

8.1 Summary of Findings

We recommend that Essential Water enhance and extend its current set of output measures to become more aligned with current best practice by reporting on service quality and performance as received by its customers. Essential Water should:

- Report on service interruption performance including the number and duration of planned and unplanned water supply interruptions by the number of customers affected. We further recommend that Essential Water should include similar data in its annual performance reports to BOM.
- Track and report the time it takes to resolve customer issues.

A suggested set of output measures that would be a better fit to Essential Water's customers' priorities and Essential Water's performance obligations is presented in the table below.

Current Output Measures	Recommended Output Measures
○ The availability (reliability) of water supply ○ Water quality ○ Response times ○ Sewerage performance ○ Customer complaints ○ Notice periods, and ○ Duration of planned interruptions.	○ Water quality events (frequency and duration of all events out of specification, frequency and duration of selected specific events (such as colour) out of specification) ○ Water supply interruptions (frequency, duration and number of customers affected by planned and unplanned interruptions) ○ Sewerage service interruptions (frequency, duration and number of customers affected by planned and unplanned interruptions) ○ Customer complaints (number by type (as reportable to BOM); response time) ○ Notifiable environmental impacts (number by type (as reportable to BOM); response time).

Essential Water has not reported performance against three of its seven current output measures (response times, notice periods and the duration of planned interruptions) and has provided limited information against other measures. This lack of performance information was addressed in IPART's last pricing determination, but it appears that the issue has not been resolved. We recommend that Essential Water be encouraged to provide performance reports using all the indicators shown in the table above, including the three current measures that it has not been reporting performance against.

We note that Essential Water was able to provide us with interruption duration data when issued with an RFI, and charts based on that data have been included in this section. We also note that Essential Energy currently reports using indicators similar to those presented in the table, so it should not be hard for Essential Water to act on these recommendations.

8.2 Customer Expectations

Essential Energy engaged Woolcott Research in April 2021 to survey its customers. Woolcott asked which factors were most important to customers and how well they thought Essential Water performed on each aspect of service. The results are summarised in Essential Water's Pricing Proposal (Section 3.2.2) and the Woolcott report is attached to the Pricing Proposal as an Appendix.

Woolcott found that Essential Water's customers considered access to clean, safe drinking water, to a reliable water supply and to a reliable, safe sewerage service to be the most important outcomes to them (indicated by the lighter bars in Figure 38). They rated Essential Water's performance in these areas somewhat lower (darker bars), indicated that they thought that Essential Water has room to improve its performance in these areas.

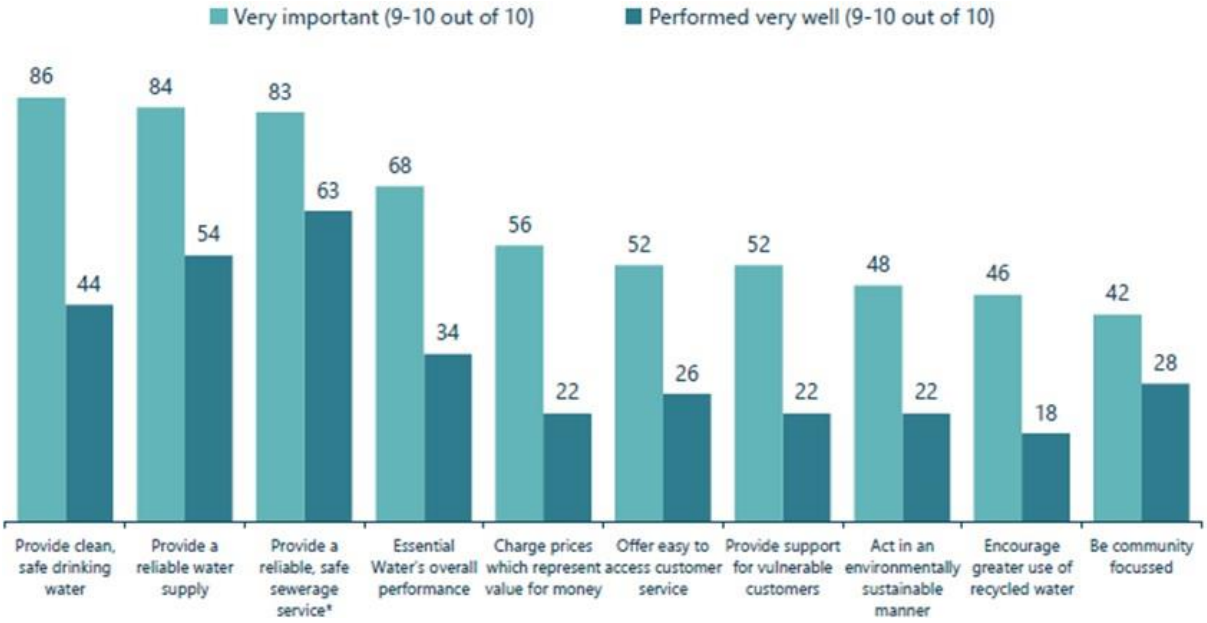

Figure 38 Customer Ratings of Factor Importance and Essential Water's Performance

8.3 Performance against Current Output Measures

Essential Water uses seven output measures to inform stakeholders on its performance in relation to customer service level targets:

- The availability (reliability) of water supply
- Water quality
- Response times
- Sewerage performance
- Customer complaints
- Notice periods, and
- Duration of planned interruptions.

It reports on a larger set of measures (155) to BOM, as do its peers, which enables its performance to be compared to its peer group using the measures for which it has provided data (101 of the 155 measures used by BOM).

IPART noted in its 2019 review that output measures are important because prices are set to enable a utility to recover the forecast costs of meeting the targets set for these measures. It also noted that data for some measures was not being collected and therefore performance against those could not be reported, particularly including response times for water and sewerage system failures. The frequency and duration of service outages was also not being recorded and reported, which means that Essential Energy was unable to demonstrate its performance (and any actions being taken to improve performance) in two of the top three areas of concern to its customers (reliability of water supply and sewerage services).

IPART's consultant in 2019 (Aither) noted in its report that Essential Water had identified its inability to measure itself against its response time targets as an issue, and that it had committed to implement appropriate procedures to address this. Aither recommended that additional improvements be made to enable Essential Water's performance against output targets to be monitored.

IPART decided to accept Essential Water's proposal to maintain current existing service level targets for the 2019 Determination Period and endorsed Aither's recommendations.

8.3.1 General Performance using the Output Measures Specified

Essential Water reports its performance against its seven output measures in Section 5.2 of its Pricing Proposal, indicating that it has achieved the targets for each at 100% (Tables 8, 9 and 10) except for water restrictions (data not available) and a slightly reduced performance (98%) in relation to minimum water pressure in 2020-21.

We attempted to verify this reported performance from original data provided by Essential Water. Data was provided on customer complaints, water quality, environmental performance and water pressure. No data was provided for the other output measures, so Essential Water's performance against these could not be verified. We have summarised the outcome of this investigation in Table 46.

Essential Water contributes annually to BOM Urban National Performance Report dataset. We have included in Table 46 comparative data from there where possible and relevant.

Table 46 Output measures

Output Measure	From Pricing Proposal or RFI	BOM Reports (FY20)		
		Indicator	EW	Peer Group
The availability of water supply	Some aspects reported. *No data provided for verification.*	Water main breaks per 100km	22.3	16.3
Water quality	All targets achieved (100%). *Comprehensive data provided for verification. Refer to the summary of water pressure below.*	Report provided as text.		
Response times	All targets achieved for four priority definitions (100%). *No data provided for verification.*	Not reported.		
Sewerage performance	All targets achieved (100%). *Only EPA data provided for verification.*	Sewer breaks per 100km	143	43
Customer complaints	All targets achieved (100%). *Data on complaints provided, but no data on response times.*	Billing / account complaints per 1,000 properties Water / sewerage complaints per 1,000 properties Water quality complaints per 1,000 properties Water service complaints per 1,000 properties	1.1 0.6 2.0 0.6	1.6 9.6 49.7 16.4
Notice periods	Not reported. *No data provided for verification.*	Not reported.		
Duration of planned interruptions	Not reported. *No data provided for verification.* *Refer to the summary of unplanned service interruptions below.*	Not reported. *(most utilities report unplanned interruption duration to BOM)*		

8.3.2 Water Pressure

Essential Water provided comprehensive data on water pressure measured at six points in its network during September 2021, starting with a point on Tin St (at the north end of Broken Hill) and ending at Bonanza St (at the south end of Broken Hill).

We have charted the pressure data provided and shown the measured pressure in psi by time of day during the month for the Tin St (Figure 39) and Bonanza St (Figure 40) meter points.

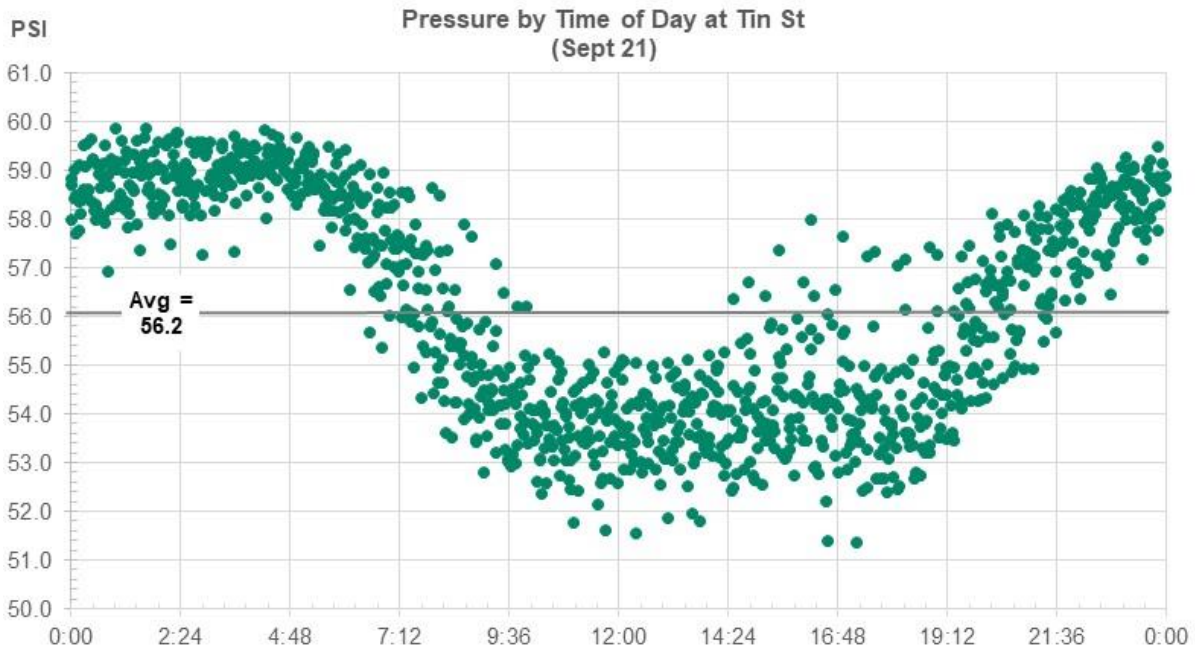

Figure 39 Water pressure measured at Tin St by time of day during September 2021

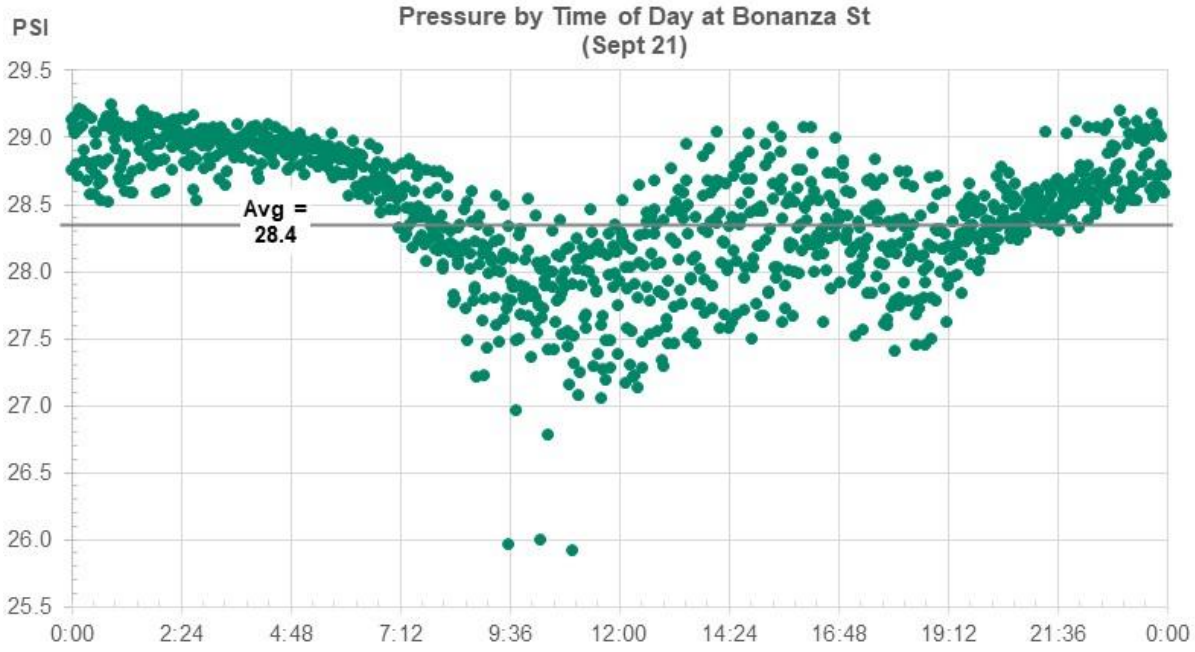

Figure 40 Water pressure measured at Bonanza St by time of day during September 2021

The pressure reduction indicated during the middle of the day reflects periods of peak water use. The measurements indicate that the water pressure at Tin St met Essential Water's targets all through the day during the month of September.

At the other end of the town, the average pressure recorded at Bonanza St was 28.4 psi, and it dropped as low as 26.0 psi during periods of peak water use. Residential water pressure below 40 psi is considered low, and anything below 30 psi is generally considered too low, although the minimum pressure required by most codes is 20 psi. It seems likely that Essential Water may be achieving its minimum flow rates on average, but in the southern parts of the town during the middle of the day it may not be reaching its minimum target. We note, however, that this is largely a design issue, not a performance one.

8.3.3 Service Interruptions

Continuity of service is a key part of service reliability. Essential Water did not include indicators of service interruption in its Pricing Proposal, nor did it provide that data to BOM. It did, however, provide useful data for the 2020-21 year in response to one of our RFIs, and we have charted that data in Figure 41, which shows the number of service interruptions by month (the light green line and trend line), the average interruption duration (the orange lines, using the right vertical axis) and the number of customers reported to have been affected (solid green bars).

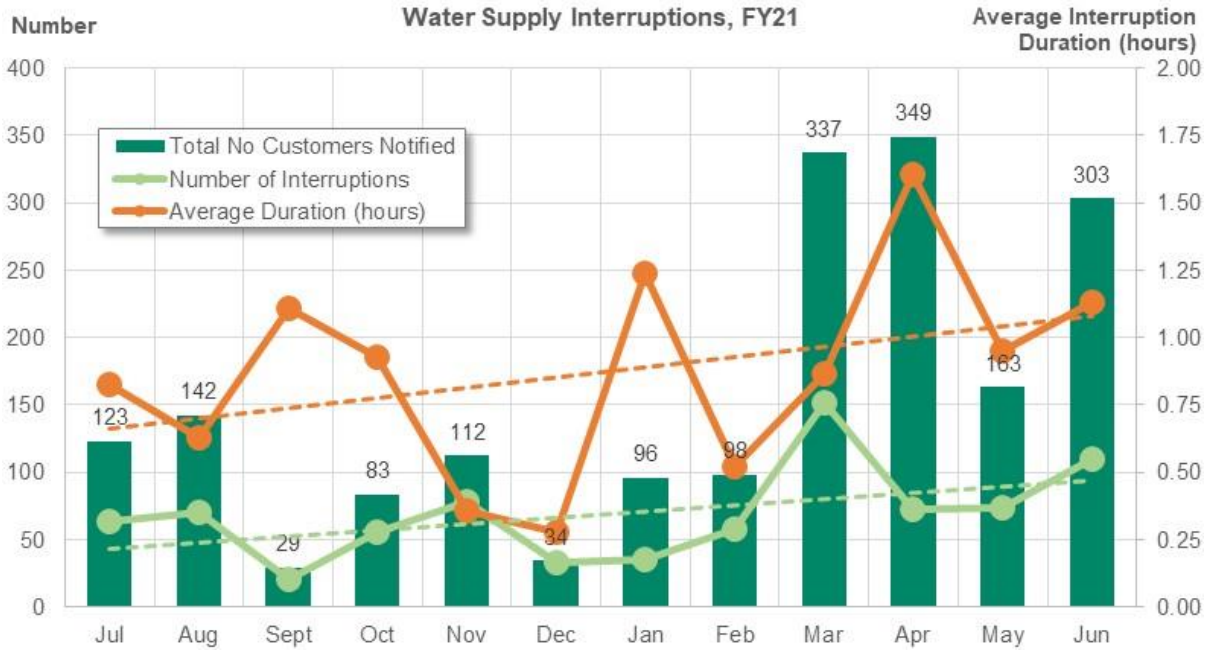

Figure 41 Water supply interruptions

The data shows all three measures increasing during the year, which is a concern, but it would require data over a longer period to form justifiable conclusions about these trends.

BOM receives data on unplanned service interruptions, so we were able to compare Essential Water's 2020-21 performance against these measures and similar data for earlier periods reported to BOM (Figure 42 and Figure 43, which show average duration and the number of unplanned interruptions for the peer group for the 9 years to 2019-20 year, and for Essential Water for the 2020-21 year). BOM data was used for the peer group, and data provided by Essential Water via an RFI was used to indicate its 2020-21 performance.

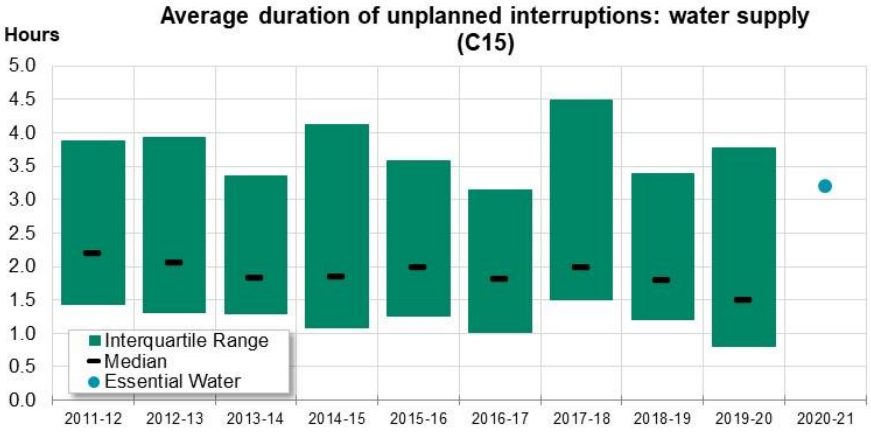

Figure 42 Duration of Unplanned Water Supply Interruptions

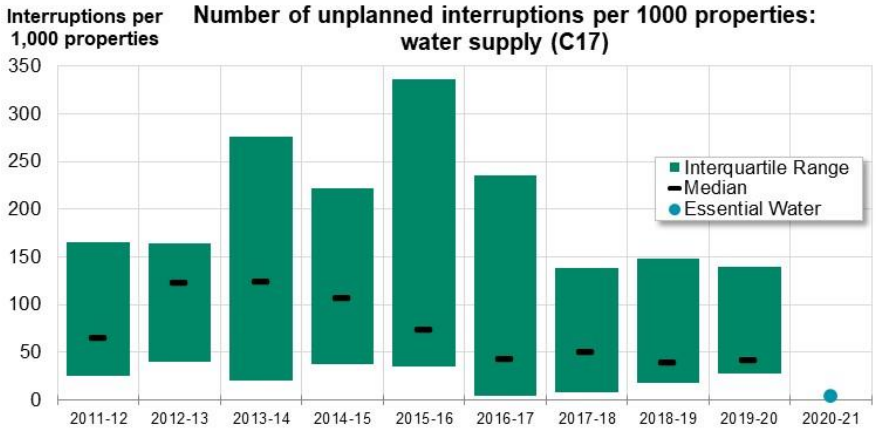

Figure 43 Number of Unplanned Water Supply Interruptions

Essential Water's data appears to indicate that it had an average unplanned interruption time well above the median of its peer group, but a total number of unplanned interruptions well below the median. We note that we have not verified the data provided by Essential Water.

8.4 The Suitability of the Current Output Measures

Essential Water's customers identified service reliability as their most important outcome.

Response time (to incidents) is included in Essential Water's list of output measures, and the need for this information was noted by IPART in its 2019 Determination. Essential Water is not currently reporting its response time performance, however, and is not reporting the reliability of its service.

We note that response time is only one aspect of reliability, and it specifically does not indicate the length of time customers affected by an incident have been without service. Best practice involves looking at performance from the customers' point of view, which in the case of water (or electricity) supply is generally taken to mean the extent of service interruption (and service quality failures) experienced by customers.

We note that Essential Energy is required to report on service interruption frequency and interruption duration to its regulator (the AER), and Essential Water has demonstrated in its response to our RFI that it is also able to report performance against these indicators. There appears to be no reason why it cannot report service reliability in the same way that Essential Energy does.

Water quality is also an issue for customers. Essential Water measures water quality to a level of detail that matches good practice in the industry. We note, however, that most customer complaints in relation to water quality are about colour (brown coloured water) and therefore suggest that this element of water quality be raised in profile in its reporting so that it can be managed and reported to customers.

Essential Water appears to have low levels of customer complaints compared to its peer group, and its data shows that the level is gradually declining. This outcome would be improved further if response times for customer complaints could also be recorded and reported. The system being used enables the date and time that a complaint is closed to be recorded, but it appears that this data is not currently being used.

In summary, we recommend that Essential Water enhance and extend its current set of output measures to become more aligned with current best practice by reporting on service quality and performance as received by its customers. To do this, Essential Water should:

- Report on service interruption performance including the number and duration of planned and unplanned water supply interruptions by the number of customers affected. We further recommend that Essential Water should include similar data in its annual performance reports to BOM.
- Track and report the time it takes to resolve customer issues.

A suggested set of output measures that would be a better fit to Essential Water's customers' priorities and Essential Water's performance obligations is presented in Table 47.

Table 47 Recommended Output Measures

Current Output Measures	Recommended Output Measures
• The availability (reliability) of water supply • Water quality • Response times • Sewerage performance • Customer complaints • Notice periods, and • Duration of planned interruptions.	• Water quality events (frequency and duration of all events out of specification, frequency and duration of selected specific events (such as colour) out of specification) • Water supply interruptions (frequency, duration and number of customers affected by planned and unplanned interruptions) • Sewerage service interruptions (frequency, duration and number of customers affected by planned and unplanned interruptions) • Customer complaints (number by type (as reportable to BOM); response time) • Notifiable environmental impacts (number by type (as reportable to BOM); response time).

We recommend that Essential Water be encouraged to provide performance reports using all the indicators shown in the table above, including the three current measures that it has not been reporting performance against.

9. Summary

9.1 Findings and Recommendations

Our findings and recommendations are summarised within each section and presented below in Table 48.

Table 48. Findings and Recommendations

Area of Review	Findings and Recommendations
Planning and Process	• The asset management documents reviewed generally provide a good foundation and high-level overview of Essential Water's approach to asset management. Some improvements have been identified for asset management documentation, that we would recommend be implemented by Essential Water. • Essential Water's asset management decision making is informed by multiple data sources/systems; however, could be improved by documented or applied data management processes to reduce risks to data consistency, quality and accuracy. Essential Water should define and document the data quality principles and data collection methods it uses, staff responsibilities for asset data, and interactions between different asset data systems. • Essential Water's decision making around sourcing water is clear and supported by clear reasoning. • Essential Water has effectively considered the effects of climate change in their planning processes.
Operating Costs –2019 Determination Period	Costs were generally found to be efficient, except for the following recommended adjustments: • A general efficiency adjustment to total operating costs of $1.2 million to reflect the neutrality of the change (increase) in labour costs from FY21 (which are reportedly the result of better cost attribution). • Corporate overhead costs, due to abnormally high-cost allocations in FY22 and as a result of the direct cost adjustments).
Operating Costs – 2022 Determination Period	Adjustments are recommended to Essential Water's proposed operating costs for: • Labour costs, which are higher over the 2022 Determination Period compared to historic costs despite changes to the network which should deliver cost benefits (namely, the Broken Hill Pipeline, Wills Street Sewerage Treatment Plant and decommissioning of the Menindee Pipeline). • Continuation of the general $0.1 million adjustment applied to total operating costs in FY21 and FY22 over the 2022 Determination Period, to reflect the neutrality of the change (increase) in labour costs from FY21 (which are reportedly the result of better cost attribution). • Hire service costs. We do not accept Essential Water's approach to forecasting. It is our view that the forecast should be based on a bottom-up analysis of contractor requirements by activity. In the absence of this, we have sought to remove one-off expenditures from the calculation of the regular/base work pattern for contractor works (namely, FY18 which was an anomalously high cost year including numerous one-off expenditures). • Fleet costs. Due to insufficient reasoning for the apparent overall increase in fleet costs, cost reductions that would be expected for maintenance of newer vehicles and considering the proposed efficiency initiative to reduce travel costs over the 2022 Determination Period. It is recommended that an average cost for the 2022 Determination Period of $1.3 million per annum be adopted (which excludes the anomalously high costs in FY25 and FY26). • A general efficiency adjustment of $0.6 million to total operating costs from FY26 to account for benefits expected of the corporate transformation program. • Corporate overhead costs, as a result of the direct cost adjustments.

Area of Review	Findings and Recommendations
	Noting that the attraction and retention of suitable staff has been raised by Essential Water as a key barrier to achieving the expected cost offset relating to the Broken Hill Pipeline, we recommend that Essential Energy explore opportunities to realise potential cost savings: • It is understood that there is currently no sharing of resources between Essential Energy and Essential Water (such as labour), noting that there are constraints to achieving this (such as different requirements for training, and different employee agreements). It is recommended that Essential Water investigate opportunities to overcome these barriers for sharing resources with Essential Energy. • Further (alternatively), there could be a shift from contractor costs to labour (utilising existing staff), with an increase in training to achieve this. As noted in the review of Essential Waters Asset Management Planning at Section 4.2), there is currently a reduced appetite for training and upskilling due to restrictions around staff redundancies and an aging workforce. This would hence represent a shift in the status quo, however could (with careful management) enable Essential Water to realise cost savings.
Cost Allocation and Corporate Overheads	• We find that the cost allocation methodology proposed is reasonable and consistent with cost allocation methodologies of comparable businesses. For the 2022 Determination Period, Essential Water has further proposed reductions to increase the efficiency of the corporate overhead allocation by applying discounts to those costs which do not directly apply to water. • Essential Water has reduced the corporate overhead costs to achieve an acceptable allocation target of around 17% by taking 50% of allocated cost items exceeding $0.2 million. While this is favourable in achieving reduced costs, Essential Water has indicated that this is unlikely to continue beyond the determination period, which presents a risk that costs will rise in future periods. • For the 2019 Determination Period, we consider that the discounts applied to allocated costs are relevant to those corporate overhead costs in FY22, and therefore have recommended that these be applied to this year also. We recommend that this reduction should be 37% of the allocated costs (the average adjustment proposed by Essential Water over the 2022 Determination Period). This reduces the allocated corporate overhead costs in FY22 from $9.2 million to $5.8 million. This represents an adjustment of $1.1 million in operating corporate overheads, and an additional adjustment of $2.2 million in capital corporate overheads. • For the 2022 Determination Period, we consider that the corporate overheads are reasonable. We have recommended efficiency adjustments to direct operating and capital costs as outlined in the following sections, and as a result the allocation of overheads is expected to change slightly due to changes in the allocator implied by the adjustments recommended to direct costs.
Capital Costs	• The capital expenditure for the 2019 Determination Period was less than the allowed amount from the IPART Determination. The main reasons for this underspend were the savings realised through the Brine Pond Decommissioning, and the delay in expenditure for the Wills St WWTP. • The Brine Pond Decommissioning project has been reviewed in detail, and we consider the project to be efficient. The project was delivered for costs well within pre-tender estimates. • A large proportion of the capital spend for 2019 is projected to be incurred in FY22. Discussions with Essential Water suggest that some project delays may be occurring and some of the allowed capital may spill over into the 2022 Determination Period. • A significant program of works has been proposed for the 2022 Determination Period. To support our review, business cases have been provided. • The Wills St WWTP project business case has been reviewed in detail. The level of detail provided in the business case with regards to cost, risk and concept designs is lower than what would be expected for a project with an estimated capital value of ~$30 million. The below the line allowances in the cost estimate generally appear to be too low. With the information provided, we do not consider the costs for the project to be reliable due to the limited level of detail provided in the business case and note risks that actual costs will exceed the estimates. We recommend IPART review this project in detail ex-post in the next pricing review.

Area of Review	Findings and Recommendations
	• We do not consider the expenditure for the Mica St WTP Concrete Remediation project to be efficient. Our review of the available information has found that there does not appear to be urgency in the project. An allowance for monitoring of degradation has instead been proposed as efficient expenditure. • In general, the business cases presented include the elements typical of a business case, however we identified several issues: – Some business cases include an allowance for overheads – this appears to also be allocated separately based on direct costs. – The business cases typically reference documents that are over five years old to demonstrate project need. – Source and accuracy of cost estimates is not generally provided. This is particularly critical for the Gate 3 Business cases. – Risks to the project should be documented within the business case.
Output Measures	• We recommend that Essential Water adjust its set of output measures to a more customer-focused set as indicated in Table 47. • We note that Essential Energy is required to report on service interruption frequency and interruption duration to its regulator (the AER) and must therefore have the systems and data collection mechanisms to enable it to do so. We recommend that Essential Water be encouraged to monitor and report its performance in the same way. This would require that its list of output measures be revised to specifically identify service reliability as a measured outcome, indicating interruption frequency and duration per customer affected. • Essential Water is measuring water quality to a level of detail that matches good practice in the industry. We note that most customer complaints in relation to water quality are about colour (brown coloured water), and therefore suggest that this element of water quality be raised in profile so that it can be managed and reported to customers. • Essential Water appears to have low levels of customer complaints compared to its peer group, and its data shows that the level is gradually declining. This outcome would be improved further if response times could also be recorded and reported. The system being used enables the date and time that a complaint is closed to be recorded, but it appears that this is not being used. • We recommend that Essential Water track and report the time it takes to resolve customer issues.

9.2 Recommended Efficient Costs for the 2019 Determination Period

Table 49 presents a summary of the recommended adjustments to Essential Water's proposed operating expenditure and recommended efficient costs over the 2019 Determination Period. Total recommended efficient operating costs over the 2019 Determination Period are $1.4 million (or 1.1%) lower than Essential Water's costs.

Table 49 Recommended Efficient Operating Expenditure - 2019 Determination Period ($ Millions, Nominal)

	FY20	FY21	FY22	Total
Essential Water Costs				
Bulk water	$25.06	$25.48	$25.74	$76.28
Labour	$6.73	$8.06	$8.51	$23.29
Hire services (contractors)	$0.35	$0.78	$1.32	$2.46
Materials	$1.62	$0.88	$0.95	$3.45
Energy	$1.41	$0.99	$0.90	$3.30
Licence fees	$0.26	$0.24	$0.29	$0.79
Fleet	$1.57	$1.23	$1.40	$4.20
Other	$0.03	$0.03	$0.11	$0.18
Corporate Overheads	$1.78	$1.87	$3.02	$6.67
Total	**$38.81**	**$39.57**	**$42.23**	**$120.61**
AECOM Recommended Adjustments				
Corporate Overheads		-$0.01	-$1.13	-$1.14
General Adjustments		-$0.12	-$0.12	-$0.24
Total		**-$0.13**	**-$1.25**	**-$1.38**
Percentage Change		**-0.3%**	**-3.0%**	**-1.1%**
Efficient Costs				
Bulk water	$25.06	$25.48	$25.74	$76.28
Labour	$6.73	$8.06	$8.51	$23.29
Hire services (contractors)	$0.35	$0.78	$1.32	$2.46
Materials	$1.62	$0.88	$0.95	$3.45
Energy	$1.41	$0.99	$0.90	$3.30
Licence fees	$0.26	$0.24	$0.29	$0.79
Fleet	$1.57	$1.23	$1.40	$4.20
Other	$0.03	$0.03	$0.11	$0.18
Corporate Overheads	$1.78	$1.86	$1.89	$5.53
General Adjustments		-$0.12	-$0.12	-$0.24
Total	**$38.81**	**$39.44**	**$40.98**	**$119.23**

Table 50 presents a summary of the recommended adjustments to Essential Water's proposed total expenditure and recommended efficient costs over the 2019 Determination Period. Total recommended efficient costs over the 2019 Determination Period are $3.7 million (or 2.2%) lower than Essential Water's proposed costs.

Table 50 Total Recommended Efficient Expenditure - 2019 Determination Period ($ Millions, Nominal)

	FY20	FY21	FY22	Total
Essential Water Costs				
Operating expenditure	$38.81	$39.57	$42.23	$120.61
Capital expenditure	$10.48	$9.74	$28.03	$48.25
Total	**$49.29**	**$49.31**	**$70.26**	**$168.86**
AECOM Recommended Adjustments				
Operating expenditure		-$0.13	-$1.25	-$1.38
Capital expenditure			-$2.29	-$2.29
Total		**-$0.13**	**-$3.55**	**-$3.67**
Percentage Change		**-0.3%**	**-5.0%**	**-2.2%**
Efficient Costs				
Operating expenditure	$38.81	$39.44	$40.98	$119.23
Capital expenditure	$10.48	$9.74	$25.74	$45.95
Total	**$49.29**	**$49.18**	**$66.72**	**$165.19**

9.3 Recommended Efficient Costs for the 2022 Determination Period

Table 51 presents a summary of the recommended adjustments to Essential Water's proposed operating expenditure and recommended efficient operating costs over the 2022 Determination Period. Total recommended efficient operating costs over the 2022 Determination Period are $5.9 million (or 3.0%) lower than Essential Water's proposed costs. The application of the continuing efficiency adjustment reduces this by a further $3.9 million.

Table 51 Recommended Efficient Operating Expenditure - 2022 Determination Period ($ Millions, $FY22)

	FY23	FY24	FY25	FY26	FY27	Total
Essential Water Costs						
Bulk water	$24.48	$24.47	$24.46	$24.45	$24.45	$122.30
Labour	$7.92	$7.92	$7.66	$7.82	$7.66	$38.99
Hire services (contractors)	$1.72	$1.22	$1.24	$1.27	$1.15	$6.60
Materials	$0.93	$0.90	$1.03	$1.05	$0.96	$4.87
Energy	$0.79	$0.76	$0.52	$0.53	$0.48	$3.09
Licence fees	$0.26	$0.25	$0.25	$0.25	$0.23	$1.24
Fleet	$1.34	$1.27	$1.54	$1.57	$1.41	$7.13
Other	$0.10	$0.10	$0.10	$0.10	$0.11	$0.52
Corporate Overheads	$2.42	$2.23	$2.14	$2.02	$1.86	$10.68
Total	**$39.96**	**$39.13**	**$38.95**	**$39.07**	**$38.31**	**$195.42**
AECOM Recommended Adjustments						
Labour			-$0.40	-$0.50	-$0.50	-$1.40
Hire services	-$0.38	-$0.38	-$0.40	-$0.43	-$0.31	-$1.89
Fleet	$0.00	$0.06	-$0.20	-$0.24	-$0.07	-$0.45
Corporate Overheads	-$0.03	-$0.03	-$0.06	-$0.10	-$0.08	-$0.29
Support Cost Allocation	-$0.12	-$0.12	-$0.12	-$0.12	-$0.12	-$0.62
Corporate Transformation				-$0.61	-$0.61	-$1.22
Total	**-$0.53**	**-$0.47**	**-$1.19**	**-$2.00**	**-$1.69**	**-$5.87**
Percentage Change	**-1.3%**	**-1.2%**	**-3.0%**	**-5.1%**	**-4.4%**	**-3.0%**
Efficient Costs						
Bulk water	$24.48	$24.47	$24.46	$24.45	$24.45	$122.30
Labour	$7.92	$7.92	$7.26	$7.32	$7.16	$37.59
Hire services (contractors)	$1.34	$0.84	$0.84	$0.84	$0.84	$4.71
Materials	$0.93	$0.90	$1.03	$1.05	$0.96	$4.87
Energy	$0.79	$0.76	$0.52	$0.53	$0.48	$3.09
Licence fees	$0.26	$0.25	$0.25	$0.25	$0.23	$1.24
Fleet	$1.34	$1.34	$1.34	$1.34	$1.34	$6.68
Other	$0.10	$0.10	$0.10	$0.10	$0.11	$0.52
Corporate Overheads	$2.39	$2.21	$2.08	$1.92	$1.78	$10.39
General Adjustments	-$0.12	-$0.12	-$0.12	-$0.74	-$0.74	-$1.84
Total	**$39.43**	**$38.66**	**$37.76**	**$37.08**	**$36.62**	**$189.55**
Efficient Costs, Including Continuing Efficiency Adjustment						
Bulk water	$24.31	$24.13	$23.95	$23.78	$23.60	$119.76
Labour	$7.87	$7.81	$7.11	$7.12	$6.92	$36.82
Hire services (contractors)	$1.33	$0.83	$0.83	$0.82	$0.81	$4.62
Materials	$0.92	$0.88	$1.01	$1.02	$0.92	$4.76
Energy	$0.78	$0.75	$0.51	$0.52	$0.47	$3.03
Licence fees	$0.26	$0.25	$0.24	$0.24	$0.22	$1.21
Fleet	$1.33	$1.32	$1.31	$1.30	$1.29	$6.54
Other	$0.10	$0.10	$0.10	$0.10	$0.11	$0.51
Corporate Overheads	$2.38	$2.18	$2.04	$1.87	$1.72	$10.18
General Adjustments	-$0.12	-$0.12	-$0.12	-$0.72	-$0.71	-$1.79
Total	**$39.15**	**$38.13**	**$36.98**	**$36.05**	**$35.35**	**$185.66**

Figure 44 presents a graphical summary of the recommended adjustments to Essential Water's proposed operating costs.

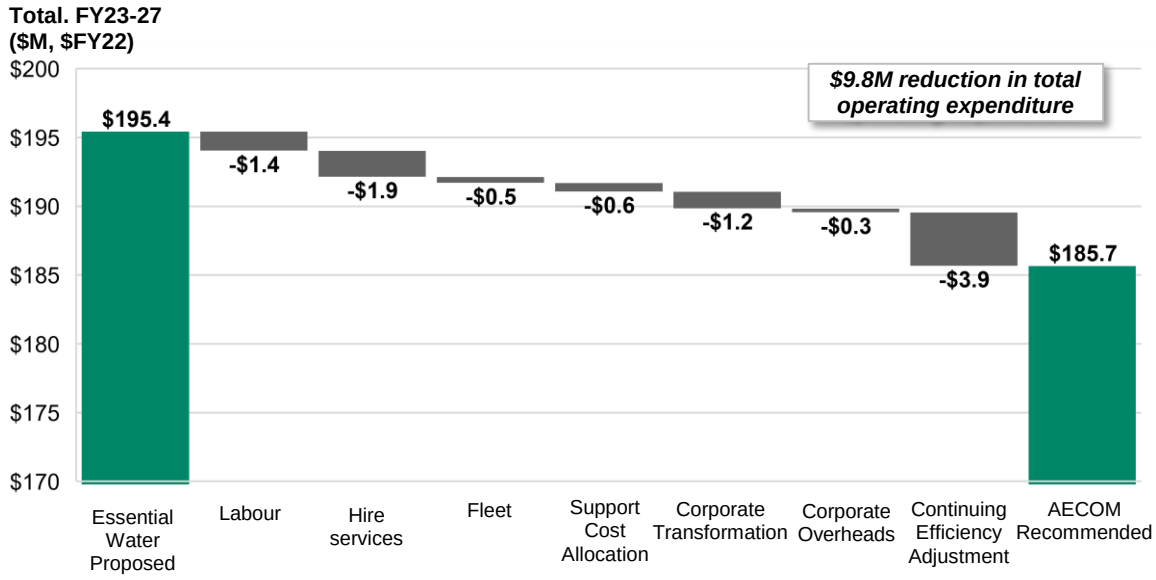

Figure 44 Adjustments to Proposed Operating Expenditure Over the 2022 Determination Period ($ Millions, $FY22)

Table 52 presents a summary of the recommended adjustments to Essential Water's proposed total expenditure and recommended efficient costs over the 2022 Determination Period. Total recommended efficient costs over the 2022 Determination Period are $8.5 million (or 3.1%) lower than Essential Water's proposed costs. The application of the continuing efficiency adjustment reduces this by a further $5.1 million.

Table 52 Total Recommended Efficient Expenditure - 2022 Determination Period ($ Millions, $FY22)

	FY23	FY24	FY25	FY26	FY27	Total
Essential Water Costs						
Operating expenditure	$39.96	$39.13	$38.95	$39.07	$38.31	$195.42
Capital expenditure	$22.25	$22.43	$16.66	$6.87	$6.81	$75.02
Total	**$62.21**	**$61.56**	**$55.61**	**$45.94**	**$45.12**	**$270.45**
AECOM Recommended Adjustments						
Operating expenditure	-$0.53	-$0.47	-$1.19	-$2.00	-$1.69	-$5.87
Capital expenditure	-$2.81		$0.12		$0.11	-$2.58
Total	**-$3.35**	**-$0.47**	**-$1.07**	**-$2.00**	**-$1.58**	**-$8.45**
Percentage Change	**-5.4%**	**-0.8%**	**-1.9%**	**-4.3%**	**-3.5%**	**-3.1%**
Efficient Costs						
Operating expenditure	$39.43	$38.66	$37.76	$37.08	$36.62	$189.55
Capital expenditure	$19.44	$22.43	$16.78	$6.87	$6.93	$72.44
Total	**$58.87**	**$61.09**	**$54.54**	**$43.94**	**$43.55**	**$261.99**
Efficient Costs, Including Continuing Efficiency Adjustment						
Operating expenditure	$39.15	$38.13	$36.98	$36.05	$35.35	$185.66
Capital expenditure	$19.30	$22.12	$16.43	$6.68	$6.69	$71.21
Total	**$58.46**	**$60.24**	**$53.40**	**$42.72**	**$42.04**	**$256.87**

Appendix A Assessment Forms

Project Name	**Broken Hill Water Supply Brine Pond Decommissioning**
Project Type	**Decommissioning**
Forecast or Historical	**Historical**
Expenditure Claimed	**$3.5M**

Project Description

The Brine Pond serving the Broken Hill Water Supply is no longer required as the Murray River to Broken Hill pipeline is complete. The work required to decommission the brine pond is as follows:
- Dewatering the brine pond by natural and mechanical means;
- Removal of the salt and liners to EPA standards;
- Decommissioning the remainder of the infrastructure to either salvage for the client or the approved waste facility;
- Leave the existing decontaminated infrastructure in place for future alternate use by Perilya Limited.

IPART Efficiency Test

The efficiency test examines whether a utility's operating and capital expenditure represents the best and most cost-effective way of delivering monopoly services to customers. Broadly, the efficiency test considers both how the investment decision is made, and how the investment is executed, having regard to, amongst other matters, the following:

1 - Customer needs, subject to the utility's regulatory requirements
2 - Customer preferences for service levels, including customers' willingness to pay
3 - Trade-offs between operating and capital expenditure, where relevant
4 - The utility's capacity to deliver planned expenditure
5 - The utility's expenditure planning and decision-making processes.

The efficiency test is based on the information available to the utility at the relevant point in time. That is:
- For forecast operating and capital expenditure, we assess whether the proposed expenditure is efficient given currently available information.
- For historical capital expenditure, we assess whether the actual expenditure was efficient based on the information available to the utility at the time it incurred the expenditure (ie, whether the utility acted prudently in the circumstances prevailing at the time it incurred the expenditure).

Technical Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
1, 2	Were/are the works reasonably required to address risks to agreed service levels or continue to deliver agreed service levels?	YES	Reduced need for water security via RO plants due to increased rainfall, and introduction of Broken Hill Pipeline.	None	Broken Hill Water Supply Approved Tender Recommendation Contract Valuation Final Gate 3 Approval - Brine Pond Decommissioning Final Gate 3 Approval - Attachment 1 MOU Final Gate 3 Approval - Attachment 2 PWA Technical Report Final Gate 3 Approval - Attachment 3 REF
1	Were/are the works reasonably required to address a legal or compliance obligation (safety, environmental or other legislative requirements)?	YES	Lease of land from Perilya Broken Hill Mining expired on 25/8/20, as per the Memorandum of Understanding.	None	
1	Were/are the works reasonably required to fulfil regulatory obligations such as those specified in a water management protocol, resource operation plan, resource operation licence or interim resource operations licence?	YES	Lease of land from Perilya Broken Hill Mining expired on 25/8/20, as per the Memorandum of Understanding.	None	
	For renewal projects - is the timing of the renewal appropriate:				
1, 2	*Based on the condition of the asset*	N/A			
3	*Based on a risk-based approach to replacement? Has service life been appropriately estimated?*	N/A			
2	Is there any evidence of customer consultation, and were the outcomes of this consistent with the scope of works proposed?	N/A	Customer consultation not applicable. Government agency consultation referenced in REF.	None	
5	Were/are alternatives evaluated (including an option analysis undertaken) as part of the scoping process?	YES	Refer to "GATE 3 CONSEQUENTIAL WORKS PROJECT; BRINE DAM DECOMMISSIONING" and "Final Gate 3 Approval - Attachment 2 PWA Technical Report"	None	

5 Were non-capex options considered? (e.g. operational solutions)	N/A	Decommissioning required due to expiration of lease.	None	Final Gate 3 Approval - Attachment 4 Project Cost Estimate Notice of Actual Completion Variation Register
5 Is the scope of the works the best means of achieving the desired outcomes?	YES	Potential improvement could have been reuse of liner in lieu of disposal - "Final Gate 3 Approval - Brine Pond Decommissioning" noted that Perilya Ltd expressed interested in retaining the liner for future use.	None	
5 Were any learnings applied from prior projects in the development of the project scope?	NO	Project relatively unique - prior similar projects not available.	None	
5 Does the (proposed) standard of the works conform with technical, design and construction requirements in legislation, industry and other standards, codes and manuals?	YES	Assessment provided in "Final Gate 3 Approval - Attachment 2 PWA Technical Report" - incl. consideration of legislation and waste code.	None	
5 Is the (proposed) standard of works compatible with existing and adjacent infrastructure or modern engineering equivalents?	YES	Assessment provided in "Final Gate 3 Approval - Attachment 2 PWA Technical Report".	None	
5 Outline any considerations relating to technological change, process redundancy and/or cost associated with improving general business performance.		It is not clear if: a) the retention of the liner for reuse by Perilya Ltd was thoroughly considered, which may have reduced the expense of liner disposal (REF No. 00080 - $373K in "Contract Valuation") b) the need for mechanical evaporation (RFV013 - $16K) was justified against implications of a prolonged project (delays in returning the land to Perilya Ltd)	None	

Technical Review Summary

Does AECOM consider the scope and standard of the project efficient?	**YES**	**Documentation quality**	**High**
Comment on efficiency	The project was delivered efficiently - multiple options were considered for brine management and salt disposal - with a low cost, technically sound solution adopted that met the project need. Potential improvements could have been investigating the potential for liner retention/reuse, but we understand that the condition of the liner meant that this may not have been possible.		

Cost Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
3	Was/is the incurred/proposed cost reasonable for the scope of the project?	YES	Salt removal process is proposed to occur over Oct to March period. Any unusual summer storm event could have delay the brine drying process or re-wetting of the dried salt mounds resulting in some abortive effort and additional standby time resulting in additional costs. Contingency ($0.5M) included to reasonably cover this costs	None	Broken Hill Water Supply Approved Tender Recommendation Contract Valuation Final Gate 3 Approval - Brine Pond Decommissioning Final Gate 3 Approval - Attachment 1 MOU Final Gate 3 Approval - Attachment 2 PWA Technical Report Final Gate 3 Approval - Attachment 3 REF Final Gate 3 Approval - Attachment 4 Project Cost Estimate Notice of Actual Completion Variation Register
3	Was/is the cost of the defined scope and standard of works consistent with conditions prevailing in the markets for engineering, equipment supply and construction?	YES	It is noted that only preferred option# 2.1 was reviewed	None	
3	Was/is the allowance for indirect costs reasonable for the scope of the project?	Insufficient information	Indirect Cost allowance is not separately shown in the estimates.	None	
4	Were/are suitable approaches taken for managing risk and uncertainty regarding projects at an early stage of development?	YES		None	
4	Does the organisation have access to the resources required to deliver the works within the proposed time frames?	YES	Project has been completed	None	
4	Was/is the proposed delivery method and project plan appropriate, and likely to result in the desired outcomes?	YES	Project has been completed	None	
3	Was/are the proposed cost escalation methods appropriate? (e.g. consistent with prevailing market conditions and historical trends)	N/A	Current quotes were received from the market for major cost items to develop the estimate. Therefore cost escalation methods were not applicable	None	
5	Were options considered in determining the least cost or preferred option?	YES	In addition, the tender price was significantly less than pre-tender estimates.	None	
5	Were the procedures/approach used for determining the preferred option appropriate in terms of determining efficient and least cost outcomes?	YES	Further savings could have been achieved if the pond liner were to be left in place for future use by Perilya. This was noted as a potential option in the Final Gate 3 approval for the project, however we understand that the condition of the liner may limit this potential.	None	
5	Is there a robust basis for the estimated project costs? i.e. Is there any evidence of estimates being informed by prior projects (specifically, the variance between actual costs for completed projects and their original estimated costs)?	NO	This is a very unique project and unlikely to have any similar projects to benchmark against. Project costs are historical and were tendered actuals.	None	
3	Did the project consider whole-of-life costs, including future maintenance and operating costs?	N/A	Decommissioning project - no ongoing costs.	None	
3	Have any potential efficiency gains been identified?	YES	Potential re-use of the liner by Perilya may have saved further circa 350K by leaving the liner in place undisturbed in the brine pond.	None	
4, 5	Was/is the adopted/proposed procurement methodology appropriate and consistent with approved procurement policy?	YES	However it is noted that only one contractor bid was received during tender process.	None	

Cost Review Summary

Does AECOM consider the project costs efficient?	**YES**	**Documentation quality**	**High**
Comment on efficiency	The project was delivered for a cost that was well below the pre-tender estimates. There was only one conforming tender submitted for the project, however a robust evaluation process was undertaken, including reference and financial checks to confirm that the tenderer could deliver the project.		

Summary

Is the project efficient?	**YES**	**Documentation quality**	**High**
Proposed adjustment	$ -	**Review status**	**DRAFT**

Project Name	**Wills St STP Upgrade**
Project Type	**Replacement/Enhancement**
Forecast or Historical	**Forecast / Historical**
Expenditure Claimed	**$30.9 M**

Project Description

There are two sewage treatment plants (STPs) in Broken Hill which treat domestic and commercial effluent:
•Wills Street STP – which was commissioned in 1939, and upgraded in the 1950s and the 1980s;
•South Broken Hill STP (South STP) – which was built in the 1960s.
The Will Street STP and South Broken Hill STP are currently operating under the NSW EPA Environment Protection Licences (EPL) No. 3925 and 5067 respectively. The EPA have issued an Environmental Improvement Plan (EIP) - attached to the Wills St EPA Licence that will require discharges to meet a new set of discharge parameters and concentration limits. Essential Water has presented data that shows it will be in breach of EPA requirements unless the plant capability is upgraded.
The proposed solution is to upgrade treatment capability to deliver compliance with EPA requirements. The options for delivering this are presented in the Wills St Business Case, and the preferred option is nominated as - Decommission South STP and transfer its sewage to a new Wills St STP.

IPART Efficiency Test

The efficiency test examines whether a utility's operating and capital expenditure represents the best and most cost-effective way of delivering monopoly services to customers. Broadly, the efficiency test considers both how the investment decision is made, and how the investment is executed, having regard to, amongst other matters, the following:

1 - Customer needs, subject to the utility's regulatory requirements
2 - Customer preferences for service levels, including customers' willingness to pay
3 - Trade-offs between operating and capital expenditure, where relevant
4 - The utility's capacity to deliver planned expenditure
5 - The utility's expenditure planning and decision-making processes.

The efficiency test is based on the information available to the utility at the relevant point in time. That is:
- For forecast operating and capital expenditure, we assess whether the proposed expenditure is efficient given currently available information.
- For historical capital expenditure, we assess whether the actual expenditure was efficient based on the information available to the utility at the time it incurred the expenditure (ie, whether the utility acted prudently in the circumstances prevailing at the time it incurred the expenditure).

Technical Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
1, 2	Were/are the works reasonably required to address risks to agreed service levels or continue to deliver agreed service levels?	YES	Project is required to address EPA requirements. In addition, STPs are reaching end of useful life - replacement is prudent to meet service levels.		Business Case GHD Report
1	Were/are the works reasonably required to address a legal or compliance obligation (safety, environmental or other legislative requirements)?	YES	The major driver for the project is to meet new EPA requirements, which the existing STPs do not have the capability of delivering. Data supports this stipulation, which presents a clear compliance risk, and it is reasonable to address this. The previous Determination recommended deferring the project, however recently updated EPA requirements, and the age of the existing plants, suggest that the timing proposed for the project is reasonable.		
1	Were/are the works reasonably required to fulfil regulatory obligations such as those specified in a water management protocol, resource operation plan, resource operation licence or interim resource operations licence?	NO			

	For renewal projects - is the timing of the renewal appropriate:			
1, 2	*Based on the condition of the asset*	YES	Assets being replaced are ageing, and reaching end of useful life. While not the primary driver, this is contributing to the ability to meet EPA requirements.	
3	*Based on a risk-based approach to replacement? Has service life been appropriately estimated?*	YES		
2	Is there any evidence of customer consultation, and were the outcomes of this consistent with the scope of works proposed?	Insufficient information		
5	Were/are alternatives evaluated (including an option analysis undertaken) as part of the scoping process?	YES	Options analysis is clearly outlined in the business case. A number of different options for the project, and then the applied technology were considered.	
5	Were non-capex options considered? (e.g. operational solutions)	YES		
5	Is the scope of the works the best means of achieving the desired outcomes?	YES	Considering the available information, proposed solution appears to be suitable. Potential for the plant to be over/underdesigned based on demand assumptions - risk to be considered in the detailed design phase.	
5	Were any learnings applied from prior projects in the development of the project scope?	Insufficient information		
5	Does the (proposed) standard of the works conform with technical, design and construction requirements in legislation, industry and other standards, codes and manuals?		Designs at concept level only.	
5	Is the (proposed) standard of works compatible with existing and adjacent infrastructure or modern engineering equivalents?		Designs at concept level only.	
5	Outline any considerations relating to technological change, process redundancy and/or cost associated with improving general business performance.	N/A		

Technical Review Summary

Does AECOM consider the project efficient from a technical perspective?	**YES**	**Documentation quality**	**Medium**
Comment on efficiency	Project appears to be required to address EPA requirements. Other benefits were noted as •Maintain compliance with the Wills St STP discharge licence requirements; •Reduced operating costs by decommissioning South STP; •Reduced annual maintenance of Wills St STP; •Improved WHS conditions for operators and visitor to the STP; •Increased beneficial reuse of treated effluent leading to reduced reliance on potable water for irrigated park lands and golf course Clear cost driver present, and options for delivery considered.		

Cost Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
3	Was/is the incurred/proposed cost reasonable for the scope of the project?	Insufficient information	A very high level estimate has been provided without sufficient backup and scope definition to assess the estimate. Inconsistencies were also noted in the estimated costs of the preferred option in the concept design and the figures used in the business case		
3	Was/is the cost of the defined scope and standard of works consistent with conditions prevailing in the markets for engineering, equipment supply and construction?	Insufficient information	Concept design report provides basis for costs - largely 'allowances'		
3	Was/is the allowance for indirect costs reasonable for the scope of the project?	Insufficient information	Indirect Costs have not been identified separately. Unable to assess		
4	Were/are suitable approaches taken for managing risk and uncertainty regarding projects at an early stage of development?	N/A	Project is in the strategic assessment and options development stage only. Contingency amount included in the estimate is low for a strategic stage estimate		
4	Does the organisation have access to the resources required to deliver the works within the proposed time frames?	N/A	Project will largely be delivered through contractors.		
4	Was/is the proposed delivery method and project plan appropriate, and likely to result in the desired outcomes?	YES	Essential Water has advised that it intends to deliver the project in two phases - detailed design and then construction. This is a prudent approach as it will allow existing risks to be considered during detailed design, and costs for these accommodated for in the construction phase.		
3	Was/are the proposed cost escalation methods appropriate? (e.g. consistent with prevailing market conditions and historical trends)	YES	Cost escalation rate of 2% has been used in financial modelling which is in line with the current RBA forecasts. However it is noted that various cost escalation rates of up to 3.5% have been used/recommended in other government funded projects		
5	Were options considered in determining the least cost or preferred option?	YES	IDEA tanks solution has been selected out of a number of options considered		
5	Were the procedures/approach used for determining the preferred option appropriate in terms of determining efficient and least cost outcomes?	YES	As above		
5	Is there a robust basis for the estimated project costs? i.e. Is there any evidence of estimates being informed by prior projects (specifically, the variance between actual costs for completed projects and their original estimated costs)?	Insufficient information	A high level estimate has been attached to the concept design files. This contingency allowances and design allowances appear to be very low for an estimate of this accuracy. Risk analysis/Monte Carlo has not been incorporated into the estimates.		
3	Did the project consider whole-of-life costs, including future maintenance and operating costs?	YES			
3	Have any potential efficiency gains been identified?	Insufficient information			
4, 5	Was/is the adopted/proposed procurement methodology appropriate and consistent with approved procurement policy?	N/A			

Technical Review Summary

Does AECOM consider the project costs to be efficient?	**Insufficient information**	**Documentation quality**	**Medium**
Comment on efficiency	A basis has been provided for the cost estimate which aligns with the concept design. The estimate is not provided to a sufficient level of accuracy for the final business case stage, and we consider that there is a risk that project costs will vary significantly from the estimate. This is further demonstrated by the relatively low contingency and design allowances for the project.		

Summary

Does AECOM consider the project efficient?	**YES**	**Documentation quality**	**Medium**
Proposed adjustment	$ -	**Review status**	**DRAFT**
Comment on efficiency	The project has a clear cost driver, and we consider that it would be prudent to proceed. However the cost estimates provided are not to a sufficient level of accuracy to give confidence in final project costs. We recommend that this project is reviewed in detail ex-post in order to review actual costs against the original estimates.		

Project Name	**Water and Sewer Reticulation Repair and Replacement**
Project Type	**Renewals**
Forecast or Historical	**Forecast & Historical**
Expenditure Claimed	**$10.7 M in forward period**

Project Description

Broken Hill Water reticulation system was built over a 30-year period starting in the 1937. Asset effective lives for water mains are 80 years, and a number of the water mains in Broken Hill have reached or are reaching this threshold. To minimise the impact of having a large number of water mains requiring replacement in any one financial year at a significant cost, EW has an on-going main replacement programme over a number of years. The proposed project is a continuation of this programme.
Until 2011 Essential Water had previously undertaken only reactive maintenance of the sewer reticulation system. Since 2011 Essential Water has continued with the sewer main inspection and relining program to reduce the number of mains and service blockages that occur. The condition of the system is steadily deteriorating with an increase in infiltration and inflows during storm events and an ongoing main relining and replacement program is deemed essential.

Efficiency Test

The efficiency test examines whether a utility's operating and capital expenditure represents the best and most cost-effective way of delivering monopoly services to customers. Broadly, the efficiency test considers both how the investment decision is made, and how the investment is executed, having regard to, amongst other matters, the following:

1 - Customer needs, subject to the utility's regulatory requirements
2 - Customer preferences for service levels, including customers' willingness to pay
3 - Trade-offs between operating and capital expenditure, where relevant
4 - The utility's capacity to deliver planned expenditure
5 - The utility's expenditure planning and decision-making processes.

The efficiency test is based on the information available to the utility at the relevant point in time. That is:
- For forecast operating and capital expenditure, we assess whether the proposed expenditure is efficient given currently available information.
- For historical capital expenditure, we assess whether the actual expenditure was efficient based on the information available to the utility at the time it incurred the expenditure (ie, whether the utility acted prudently in the circumstances prevailing at the time it incurred the expenditure).

Technical Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
1, 2	Were/are the works reasonably required to address risks to agreed service levels or continue to deliver agreed service levels?	YES	Required to maintain standard of service to customers - quality, reliability, and security of water/sewer services	None	Essential Water - Broken Hill - Tender Program 24.03.20 Gate 2 Approval - Project 8 - Water Mains Renewal Programme Gate 2 Approval 2017.18 Project 15 Sewer Mains Renewal High Level Methodology Request for Quotation Sewer Lining Project 2019 21 Water Main Bursts Investigation Email - 1.03 Water and Sewer Reticulation
1	Were/are the works reasonably required to address a legal or compliance obligation (safety, environmental or other legislative requirements)?	NO	Works not related to legal obligations other than customer service standards. Sewer upgrades may be positively associated with licence compliance for wet weather surcharges but not discussed in documentation.	None	
1	Were/are the works reasonably required to fulfil regulatory obligations such as those specified in a water management protocol, resource operation plan, resource operation licence or interim resource operations licence?	YES	Required to maintain standard of service to customers - quality, reliability, and security of water/sewer services	None	
	For renewal projects - is the timing of the renewal appropriate:				
1, 2	*Based on the condition of the asset*	YES	A number of the water mains in Broken Hill have or are reaching the predicted lifetime to deterioration failure. Sewer - impacts to wet weather flows and condition assessment report provided are commensurate with poor condition.	None	
3	*Based on a risk-based approach to replacement? Has service life been appropriately estimated?*	YES	Water. Basis: National Asbestos Cement Pressure Pipe Manual (Water New Zealand, 2017), Water Research Foundation guidance manual. Sewer. Not based on service life estimates but increase in repair costs and wet weather flow increases.	None	

2 Is there any evidence of customer consultation, and were the outcomes of this consistent with the scope of works proposed?	NO	No evidence of consultation for watermain renewals - nor particularly relevant for works proposed.	None	Repair and Replacement EBM1485-02-C-REP Broken Hill Main Bursts Review and Renewal 20191022-130427-Broken_hill_6_E92_3_Fit t_Resources_Manhole_ Condition_Assessment_ Report
5 Were/are alternatives evaluated (including an option analysis undertaken) as part of the scoping process?	YES	Water: Refer to options assessment in "Broken Hill Main Bursts Review and Renewal" and Gate 2 approval document. Sewer: Do nothing or Slip-lining (due to current alignments)	None	
5 Were non-capex options considered? (e.g. operational solutions)	N/A	Watermain and sewer main breaks are not sufficiently mitigated by operational solutions	None	
5 Is the scope of the works the best means of achieving the desired outcomes?	YES	Water: Priority to be given to higher risk assets (smaller diameter). Sewer: Slip-lining is an appropriate method but is the only method proposed other than 'do nothing'. It would be helpful to compare suitability of other techniques.	None	
5 Were any learnings applied from prior projects in the development of the project scope?	YES	Water: Not specific to project area but reference documents in "Broken Hill Main Bursts Review and Renewal" cite case studies. Sewer: EW appears to have favourable experiences with slip-lining from the past 10 years - relining program since 2011.	None	
5 Does the (proposed) standard of the works conform with technical, design and construction requirements in legislation, industry and other standards, codes and manuals?	YES	Water: Refer to reference documents in "Broken Hill Main Bursts Review and Renewal" Sewer: AS 2566	None	
5 Is the (proposed) standard of works compatible with existing and adjacent infrastructure or modern engineering equivalents?	YES	Water: Thorough consideration made of available technologies. Sewer: Slip-lining is an established method of rehabilitation.	None	
5 Outline any considerations relating to technological change, process redundancy and/or cost associated with improving general business performance.	YES	Water: Asbestos cement pipes have not been used for watermains since the 1980s and it is appropriate to remove ageing pipes from service. Sewer: Consideration of all available technologies may result in better service outcomes.	None	

Technical Review Summary

Is the project efficient from a technical perspective?	**YES**	**Documentation quality**	**High**
Comment on efficiency	Proposed solutions are necessary and sufficiently efficient based on age of assets and predicted service life. Water: More investigations could be made into downward trend of main failures in the years leading to 2019 - which appears inconsistent with predicted service life. Sewer: Consideration of other technologies may result in more efficient outcomes.		

Cost Review

	Consideration	Response	Comment	Impact on Claim	Information Assessed
3	Was/is the incurred/proposed cost reasonable for the scope of the project?	YES	Direct cost estimate are with in acceptable range	None	Essential Water - Broken Hill - Tender Program 24.03.20 Gate 2 Approval - Project 8 - Water Mains Renewal Programme Gate 2 Approval 2017.18 Project 15 Sewer Mains Renewal High Level Methodology Request for Quotation Sewer Lining Project 2019 21 Water Main Bursts Investigation Email - 1.03 Water and Sewer Reticulation Repair and Replacement EBM1485-02-C-REP Broken Hill Main Bursts Review and Renewal 20191022-130427-Broken_hill_6_E92_3_Fit t_Resources_Manhole_ Condition_Assessment_ Report
3	Was/is the cost of the defined scope and standard of works consistent with conditions prevailing in the markets for engineering, equipment supply and construction?	YES	It is noted that only high level estimate has been provided for an assumed scope, rather than a predefined scope of works	None	
3	Was/is the allowance for indirect costs reasonable for the scope of the project?	Insufficient information	Indirect Cost are not included Water Reticulation. Indirect Cost for Sewage Reticulation estimate (0.256M) is at the higher end of the acceptable range	None	
4	Were/are suitable approaches taken for managing risk and uncertainty regarding projects at an early stage of development?	YES	Allowance of 0.21M (11%) has been made in the estimate for risk contingency	None	
4	Does the organisation have access to the resources required to deliver the works within the proposed time frames?	YES	It is proposed that Essential Water utilise their internal resources to deliver this work	None	
4	Was/is the proposed delivery method and project plan appropriate, and likely to result in the desired outcomes?	YES		None	
3	Was/are the proposed cost escalation methods appropriate? (e.g. consistent with prevailing market conditions and historical trends)	YES	High level estimate is in the acceptable range	None	
5	Were options considered in determining the least cost or preferred option?	NO	High cost method has been adopted for Water Reticulation renewal program considering the safety and to minimise potential of asbestos contamination.	None	
5	Were the procedures/approach used for determining the preferred option appropriate in terms of determining efficient and least cost outcomes?	NO	Least cost outcome was not adopted	None	
5	Is there a robust basis for the estimated project costs? i.e. Is there any evidence of estimates being informed by prior projects (specifically, the variance between actual costs for completed projects and their original estimated costs)?	Insufficient information	Estimated cost is with acceptable range. There is no evidence of bench marking the cost with other projects	None	
3	Did the project consider whole-of-life costs, including future maintenance and operating costs?	NO	No operating cost (OPEX) details have been provided	None	
3	Have any potential efficiency gains been identified?	YES	Efficiency gains in terms of reliability and serviceability have been noted in the CWT report	None	
4, 5	Was/is the adopted/proposed procurement methodology appropriate and consistent with approved procurement policy?	YES	Essential Water is to use its internal resources to deliver the program and have sufficient experience in this area. No consideration have been given to tendering and obtaining check prices from the market	None	

Cost Review Summary

Is the project deemed efficient from a cost perspective?	**YES**	**Documentation quality**	**Medium**
Comment on efficiency	Estimated costs have been reasonable, however it is noted that a) low cost option has not been adopted and b) no consideration have been given to obtain market costs		

Summary

Is the project efficient?	**YES**	**Documentation quality**	**Medium**
Proposed adjustment	$ -	**Review status**	**DRAFT**
Comment on efficiency			

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