



FINAL REPORT

Essential Water's water and sewerage services in Broken Hill

Demand Review

*Prepared for
Independent Pricing and Regulatory Tribunal
7 December 2021*

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Executive summary

The Task

IPART has commenced its review of maximum prices to apply from 1 July 2022 for:

- Essential Water's water and wastewater services to its customers in Broken Hill and surrounding areas (Menindee, Sunset Strip and Silverton), and
- Water NSW's Broken Hill Pipeline (the Pipeline) bulk water transportation services covering Broken Hill and surrounding areas.

As part of the price reviews, IPART has engaged The Centre for International Economics (The CIE) to complete an independent evaluation of:

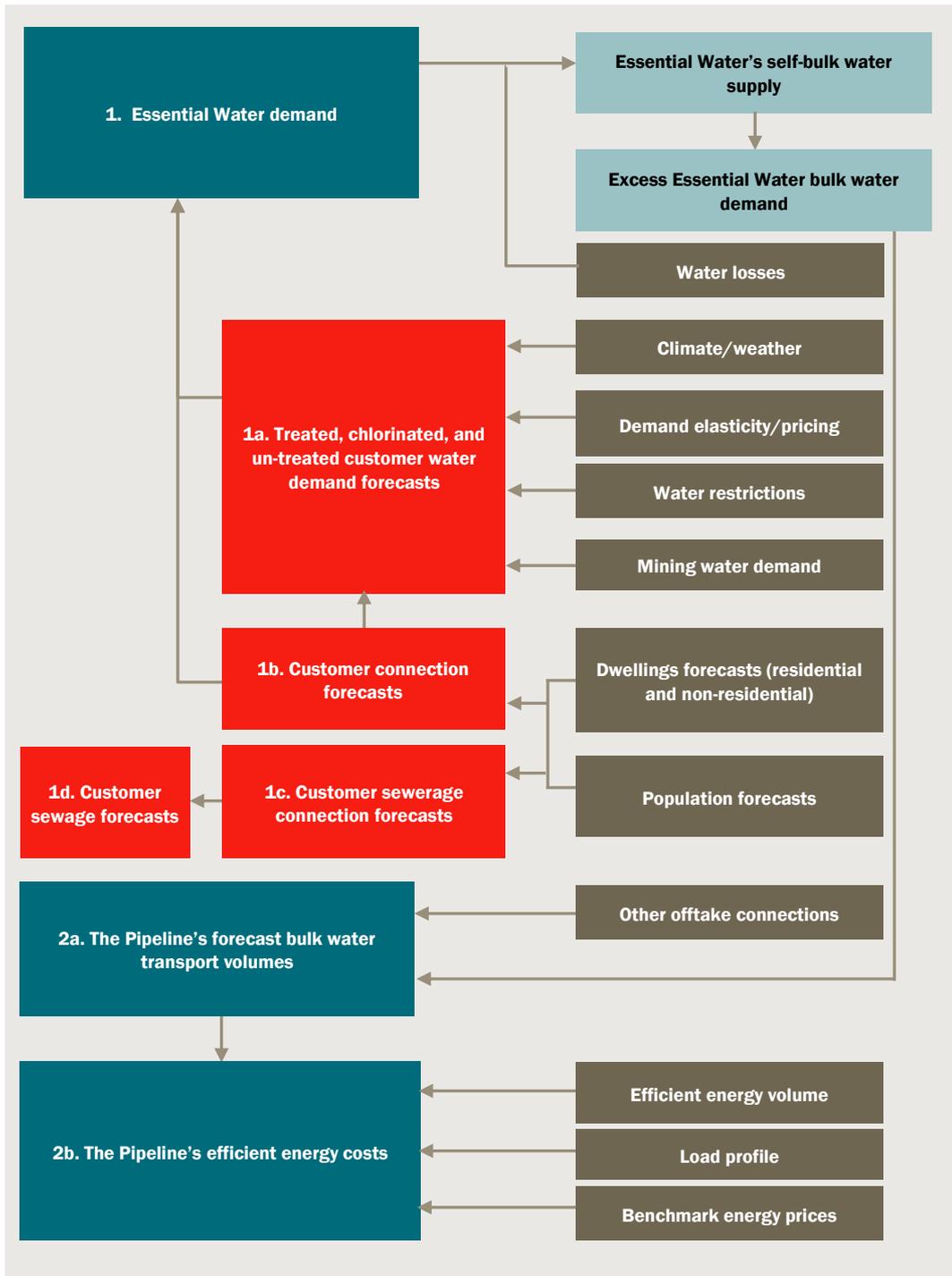
- 1 Essential Water's forecast customer demand, consisting of:
 - a) customer number forecasts (table A.1 for potable water and table A.2 for sewerage), and
 - b) water demand forecasts for treated water (table A.3), chlorinated water (table A.4), un-treated water sales (table A.5) and sewerage (table A.6), and
- 2 the Pipeline's:
 - a) bulk water customer demand forecasts (table A.7), and
 - b) proposed efficient energy costs (table A.8).¹

This report covers task 1. Task 2 is covered in The CIE 2021, 'Water NSW's Broken Hill Pipeline: Bulk Water Transport Volume Demand and Energy Review Final Report', December.

Each of these forecasts are underpinned by demographic and climatic inputs outlined in chart 1, which in turn have been assessed as part of the scope of works.

¹ Refer to Appendix A for Essential Water's customer and water demand, as well as and Water NSW's Broken Hill Pipeline forecast bulk water transport connections and volumes.

1 Overview of the scope of works



Data source: CIE.

Purpose of forecasting

Demand forecasts form a primary input into regulatory decisions. Demand forecasts:

- influence the notional revenue allowance through:
 - operating expenditure projections
 - capital expenditure projections and hence the regulatory asset base, which in turn impacts on depreciation and the return on capital, and
 - influence prices as prices are set so that demand multiplied by prices is equal to the notional revenue allowance.

Demand forecasts are also a primary input into decision-making by businesses. They can help to inform:

- pricing structures
- risks and risk management — if demand forecasts have a stochastic component rather than being a single forecast, and
- capital and operating expenditure planning decisions.

Essential Water findings

Water connection projections

Table 2 presents CIE's water connection forecast, with further discussion in chapter 1.

We recommend for:

- **residential connections serviced with treated/potable water**, using a midpoint estimate of ABS and development approvals trends for total number of residential dwellings and using DPIE projections to estimate the number of occupied dwellings. This only slightly differs from Essential Water's projections.
- **residential connections serviced with chlorinated/non-potable water**, adopting Essential Water's approach to use 2020-21 actuals. However, we note that since Essential Water's pricing proposal submission in May 2021 the actual number of connections for the financial year 2020-21 has slightly changed, which is reflected in our recommended figures.
- **non-residential connections**, adopting Essential Water's approach to use 2020-21 actuals. However, we note that since Essential Water's pricing proposal submission in May 2021 the actual number of connections for the financial year 2020-21 has slightly changed, which is reflected in our recommended figures.
- **the newly proposed Cobalt Blue Mine**, adopting Essential Water's approach to not include estimates in the projections due to high uncertainty and the current stage of the project. However, given the potentially significant demand from the proposed

mine, IPART could consider shortening the determination period for the next pricing determination round.

2 CIE recommendations - Essential Water connections

Type of connection	2022-23	2023-24	2024-25	2025-26	2026-27
Treated/potable water					
Residential properties ^a	9 447	9 454	9 461	9 468	9 474
Residential billable entities ^a	9 788	9 795	9 802	9 809	9 815
Number of customers/meters					
Non-exempt, non-residential (excl. mines)	592	592	592	592	592
Exempt, non-residential (excl. mines)	220	220	220	220	220
Mines	17	17	17	17	17
Number of 20mm meter equivalents					
Non-exempt, non-residential (excl. mines)	1 069	1 069	1 069	1 069	1 069
Exempt, non-residential (excl. mines)	946	946	946	946	946
Mines	277	277	277	277	277
Chlorinated/non-potable water					
Residential properties ^b	176	176	176	176	176
Untreated/non-potable water					
Number of customers/meters					
Non-exempt, non-residential (excl. mines)	47	47	47	47	47
Exempt non-residential (excl. mines)					
Mines	7	7	7	7	7
Number of 20mm meter equivalents					
Non-exempt, non-residential (excl. mines)	75	75	75	75	75
Exempt non-residential (excl. mines)	-	-	-	-	-
Mines	179	179	179	179	179

^a Broken Hill and Menindee.

^b Silverton and Sunset Strip.

Source: CIE.

Water usage projections

Table 3 presents CIE's water usage forecast, as well as Essential Water's projection, with further discussion in chapter 1.

We recommend for:

- **residential connections serviced with treated/potable water**, using a linear regression analysis to estimate per dwelling demand factoring in annual precipitation,

maximum temperature and water restrictions. We understand Essential Water's projections are based on their consultant's system level analysis of treated water production with modelled lawn irrigation,² noting we have not been provided with the full underlying model. We have derived our own independent projections based on a multi-variate regression model. Our recommendation results in 4 to 5 per cent higher water consumption estimates compared to Essential Water.

- **residential connections serviced with chlorinated/non-potable water**, adopting Essential Water's approach to use 2020-21 actuals. However, we note that since Essential Water's pricing proposal submission in May 2021 the actual number of connections for the financial year 2020-21 has slightly changed, which is reflected in our recommended figures.
- **non-residential connections**, adopting Essential Water's approach to use 2020-21 actuals. However, we note that since Essential Water's pricing proposal submission in May 2021 the actual number of connections for the financial year 2020-21 has slightly changed, which is reflected in our recommended figures.
- **the newly proposed Cobalt Blue Mine**, adopting Essential Water's approach to not include estimates in the projections due to high uncertainty and the current stage of the project. However, given the potentially significant increased water demand (up to 25 per cent more) from the proposed mine, IPART could consider shortening the determination period for the next pricing determination round.

3 CIE recommendations – Essential Water usage

Type of connection	2022-23	2023-24	2024-25	2025-26	2026-27
	ML	ML	ML	ML	ML
Treated water					
Residential	2 448	2 427	2 406	2 385	2 364
Non-residential (excl. mines)	308	308	308	308	308
Mines	1 232	1 232	1 232	1 232	1 232
Exempt customers	312	312	312	312	312
Chlorinated water					
Total chlorinated	40	40	40	40	40
Untreated water					
Pipeline customers (excluding exempt properties and mines)	75	75	75	75	75
Mines	516	516	516	516	516
Non-residential (excl. mines)	350	350	350	350	350
Total billed metered consumption	5 281	5 260	5 239	5 218	5 197

² PWA (2021), Essential Water, *Integrated Water Cycle Management Strategy Issues Paper*, p. 48

Type of connection	2022-23	2023-24	2024-25	2025-26	2026-27
	ML	ML	ML	ML	ML
Real losses (i.e. leakage) ^a	512	510	508	506	504
CIE recommendation – Total water required	5 792	5 769	5 746	5 723	5 700
Essential Water proposed – Total water required	5 703	5 682	5 661	5 640	5 619

^a Real losses are assumed to be 8.8 per cent as per 2020-21.

Source: CIE.

Sewerage discharge volumes projections

Table 4 presents CIE's sewerage discharge forecasts, with further discussion in chapter 1.

We recommend for:

- **residential connections connected to sewerage**, adjusting the number of residential properties and billable entities by the average water to sewerage connection ratio. In the past 5 years this ratio was relatively constant at ~96 per cent. Our projections differ only slightly to Essential Water's projections.
- **the deemed residential sewerage allowance**, accepting Essential Water's proposition to increase the allowance to 100 kL per year. Based on Essential Water's methodology, we estimated the average sewage discharge per residential connection around 102 to 105 kL per year. We note that Essential Water's methodology and estimate are very conservative as the implied discharge factor is approximately 40 per cent. This is significantly lower than discharge factors used by other water utilities to determine the discharge allowance.
- **non-residential connections and discharge volumes**, adopting Essential Water's approach to use 2020-21 actuals. However, we note that since Essential Water's pricing proposal submission in May 2021 the actual number of connections for the financial year 2020-21 has slightly changed, which is reflected in our recommended figures.
- **the newly proposed Cobalt Blue Mine**, adopting Essential Water's approach to not include estimates in the projections due to high uncertainty and the current stage of the project.

4 CIE recommendations – Essential Water sewerage connections

Type of connection	2022-23	2023-24	2024-25	2025-26	2026-27
Connections					
Residential properties	9 049	9 052	9 055	9 058	9 061
Residential billable entities	9 377	9 380	9 383	9 386	9 389
Number of customers/meters					
Non-exempt, non-residential (excl. mines)	537	537	537	537	537
Exempt, non-residential (excl. mines)	138	138	138	138	138
Mines	2	2	2	2	2
Number of 20mm meter equivalents					
Non-exempt, non-residential (excl. mines)	928	928	928	928	928
Exempt, non-residential (excl. mines)	674	674	674	674	674
Mines	50	50	50	50	50
Discharge volume (ML/year)					
Non-residential	231	231	231	231	231
Exempt	277	277	277	277	277
Mines	40	40	40	40	40

Source: CIE.

1 *Essential Water customer number and water demand forecasts*

KEY POINTS:

Essential Water's water demand forecasts are based on a previously undertaken Integrated Water Cycle Management (IWCM) Strategy analysis and their own forecast of occupied and unoccupied dwellings. The IWCM analysis assessed the impact of a range of factors on water consumption, including demographic trends, climate, pricing and restrictions, and developed forecasts of households annual unrestricted demand, under average conditions.³ For its submission, Essential Water only used the parameter estimates of the average annual demand per dwelling and *not* the projected dwelling forecast from the IWCM analysis.⁴

Total projected water demand consists of treated, chlorinated and untreated water by customer base (i.e., residential, non-residential and mines). Essential Water forecasts that non-residential treated water, chlorinated water and untreated water sales and customer numbers remain consistent with actual sales from 2020-21.⁵ Therefore, only residential water demand is modelled which depends on future expectations of population, the number of dwellings and household size.

Essential Water provides sewerage services only to Broken Hill while operating two sewage treatment plants in the North and South of Broken Hill. The treatment plant also receives sewage from mines and local businesses. Essential Water propose to increase residential connection deemed sewerage discharge volumes from 90kL to 100kL per annum for the 2022 determination period, following their review which found that forecast average residential discharges are likely to be between 105kL and 110kL per annum.⁶ The review was undertaken by PWA in their IWCM analysis.

³ Essential Water 2021, 'Pricing Proposal: Submission', table 24: forecast customer numbers for potable water (excl mines), p. 70, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-Proposal-by-Essential-Water-June-2021.PDF

⁴ The analysis undertaken by the Public Works Advisory (PWA) assumed a static population and a decreasing household size resulting in an increase in the number of occupied dwellings, which is in contrast to DPIE projections and also the most recent population and dwelling trends.

⁵ Essential Water 2021, 'Pricing Proposal: Submission', table 24: forecast customer numbers for potable water (excl mines), p. 71,

⁶ Essential Water Pricing Proposal: Submission Page 10: CEO forward We propose to largely maintain our existing price structure as it is efficient and generally supported by customers. In a follow up information request, Essential Water later confirmed that the 105-110kL figures quoted in their Pricing Submission were based on earlier IWCM data.

Dwelling and number of connections projections

RECOMMENDATION

- 1 Non-residential customers and connections
 - a) Essential Water's assumption to keep the number of non-residential customers/connections constant and in line with actuals from 2020-21 is reasonable, given the actual numbers in previous years. We recommend adopting the same approach; however, we note that since Essential Water's pricing proposal submission in May 2021 the actual number of connections for the financial year 2020-21 have slightly changed, which is reflected in our recommended figures.
- 2 Residential customers and dwellings:
 - a) Essential Water's forecasts of residential dwelling and customer numbers for Broken Hill and Menindee are based on DPIE projections for occupied dwellings and trends of actual number of serviced dwellings in the past 15 years. This leads to an overall slight increase of 5 to 6 dwellings per year accompanied by a decrease in population and number of occupied dwellings. The number of residential dwellings for Silverton and Sunset Strip is kept constant in line with 2020-21 actuals.
 - b) We recommend using a midpoint estimate of the trend projections based on ABS and development approval numbers for Broken Hill and Menindee to project the total number of dwellings. For the total number of occupied dwellings, we recommend using the trend implied by the DPIE projections for the total number of dwellings. This reflects both the decreasing population and change in household size. Our projections differ only slightly to those presented by Essential Water.

Based on the trend of the past 15 years we recommend using 2020-21 actuals for the number of residential dwellings in Silverton and Sunset Strip.
- 3 Proposed Cobalt Blue Mine:
 - a) Essential Water's estimates do not include the newly proposed Cobalt Blue Mine. The new mine could represent a substantial increase in terms of both non-residential and residential connections from construction and mining workers moving to Broken Hill. Due to the high uncertainty of the realisation of the mine and the current stage of the project, we recommend adopting Essential Water's approach and to not include an estimate for the proposed mine.
 - b) However, given the potentially significant demand from the proposed mine, IPART could consider shortening the determination period for the next pricing determination round.

Residential dwellings

Essential Water services not only Broken Hill but also the surrounding areas of Menindee, Sunset Strip and Silverton. However, Broken Hill and Menindee are serviced

with treated/potable water while Sunset Strip and Silverton receive chlorinated/non-potable water.⁷

Essential Water forecasts dwellings using the following assumptions.

- Broken Hill and Menindee (treated/potable water):
 - Declining population and number of *occupied* dwellings in line with DPIE projections
 - Total number of dwellings (occupied and unoccupied) are slightly increasing in accordance with the past 15-year trend.
- Sunset Strip and Silverton (chlorinated/not-potable water):
 - Total number of residential dwellings serviced remains constant

1.1 Total number of residential properties serviced

	Number of dwellings							
	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Treated/potable water (Broken Hill and Menindee)	9 424	9 434	9 442	9 448	9 453	9 459	9 464	9 470
Chlorinated/non-potable water (Sunset Strip and Silverton)	169	176	169	169	169	169	169	169
Total	9 593	9 610	9 611	9 617	9 622	9 628	9 633	9 639

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx, Table 1.1

Essential Water reports two figures for the number of residential dwellings, the total number of 'residential properties' and 'residential billable entities' (chart 1.2). Prior to 2013-14 the number of residential billable entities excluded flats and units, while after 2013-14 flats and units are counted four-fold. Therefore, the number of residential properties is the figure most comparable with the actual number of residential dwellings.

In the past, the total number of private dwellings has slightly increased over time while the number of occupied dwellings decreased.

⁷ Essential Water 2021, 'Essential Water Integrated Water Cycle Management Strategy: Issues Paper', Table S.6: Projected loads and flows – Wills St STP & Table S.7: Projected loads and flows – South STP, Report Number WSR 16095, January, p. 23

1.2 Essential Water customer forecast (treated and chlorinated water)



Note: After 2013-14 units and flats, which have common meters were multiplied times 4.

Data source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx

Essential Water's actual number of dwellings served with treated water increased on average by 4 dwellings per annum, which underpins their projections for the total number of dwellings. The total number of dwellings served with chlorinated water remained constant ranging between 169 and 176 in the past 15 years. This is likely due to a high number of holiday homes and retirees in Sunset Strip and Silverton.

We have crosschecked Essential Water's projections using different sources:

- Broken Hill and Menindee (treated/potable water):
 - ABS⁸ figures show that, in the past 10 years, the number of occupied dwellings decreased, while the overall number of dwellings increased on average by 8 dwellings per year,
 - DPIE projections⁹ of implied occupied dwelling numbers suggest an annual decrease of 74 in the coming years, and
 - Development approval¹⁰ numbers between 2016 and 2019 show that on average 6 new occupied dwellings per year are approved.
- Sunset Strip and Silverton (chlorinated/not-potable water):
 - Essential Water's customer number report suggests that the total number of served dwelling remained relatively constant in the past 15 years.

For the population and dwelling projections, we recommend using:

- a midpoint estimate of the trend projections based on ABS and development approval numbers for Broken Hill and Menindee, i.e., treated/potable water (table 1.3). In

⁸ 2016 Census - Counting Dwellings, Broken Hill LGA

⁹ NSW DPIE (2019) Population Projections, ASGS 2019 LGA projections LGA projected households

¹⁰ <https://data.nsw.gov.au/data/dataset/local-development-performance-monitoring-2018-19/resource/3c9de232-e401-4f8d-b83a-aa9ce13330e9>

addition, the number of occupied dwellings should decrease in line with DPIE projections. This differs only slightly from Essential Water's estimate.

- The actual total number of dwellings served in Silverton and Sunset Strip in 2020-21, i.e., chlorinated/non-potable water (table 1.4). This assumption does not differ from Essential Water, however, since the submission of the pricing proposal in May 2021 the actual 2020-21 customer number was updated, which is reflected in our estimate.

1.3 Residential dwellings serviced with treated/potable water

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Total number of dwellings						
Essential Water	9 442	9 448	9 453	9 459	9 464	9 470
CIE recommendation	9 441	9 447	9 454	9 461	9 468	9 474
Total number of residential billable entities						
Essential Water	9 783	9 789	9 794	9 800	9 805	9 811
CIE recommendation	9 782	9 788	9 795	9 802	9 809	9 815

Note: Total number of residential billable entities differs from the total number of dwellings as units and flats are counted on average as four billable entities.

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.1, CIE.

1.4 Residential dwellings serviced with chlorinated/non-potable water

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Total number of dwellings						
Essential Water	169	169	169	169	169	169
CIE recommendation	176	176	176	176	176	176
Total number of residential billable entities						
Essential Water	169	169	169	169	169	169
CIE recommendation	176	176	176	176	176	176

Note: Total number of residential billable entities differs from the total number of dwellings as units and flats are counted on average as four billable entities.

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.1, CIE.

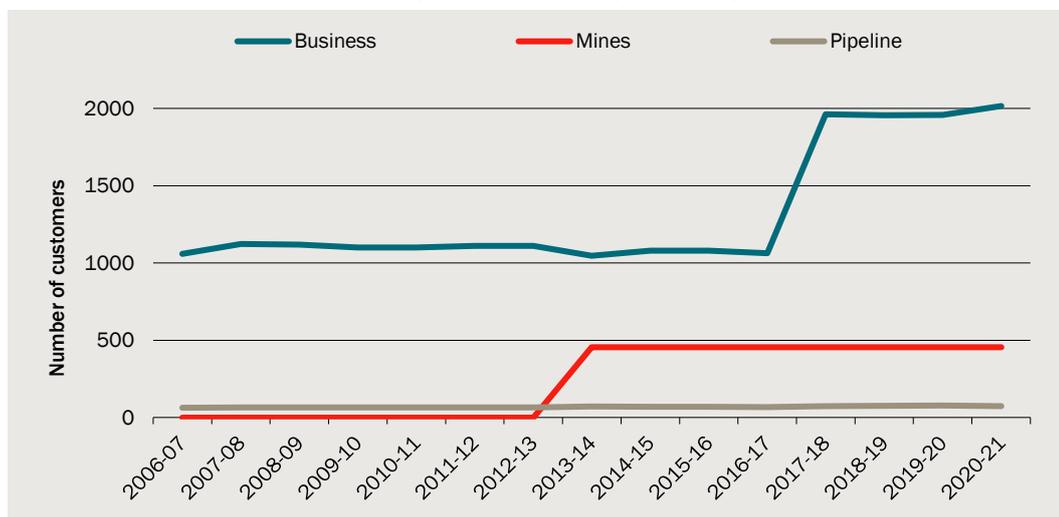
Non-residential connections

Essential Water services approximately 800 non-residential customers, two mining companies as well as pipeline customers across Broken Hill, Menindee, Silverton and Sunset Strip (chart 1.5). Essential Water provides businesses both with filtered and unfiltered water in Broken Hill and Menindee, but only with chlorinated non-potable water in Silverton and Sunset Strip.¹¹ Commercial and mining customers can have multiple connections and meters, but also meters of different sizes, i.e., they range from

¹¹ Essential Water 2021, 'Essential Water Integrated Water Cycle Management Strategy: Issues Paper', Table S.6: Projected loads and flows – Wills St STP & Table S.7: Projected loads and flows – South STP, Report Number WSR 16095, January, p. 23

20mm up to 150mm. Therefore, the total number of connections is often expressed in '20mm meter equivalents.'¹²

1.5 Non-residential customers (20mm meter equivalents)



Note: From 2016-17 on exempt business are also counted. To date it is unclear how many 20mm meter equivalents the new Cobalt Blue mine might need.

Data source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx

Essential Water proposes to keep the number of 20mm meter equivalents constant in line with actuals in 2020/21, while the potential demand from the proposed Cobalt Blue mine is not factored in.

We recommend adopting this approach as the number of connections has been relatively stable in the past 15 years. However, since Essential Water's pricing submission in May 2021 the number of 20mm meter equivalents has slightly changed, which is reflected in our recommendation.

1.6 Non-residential connections serviced with treated, untreated and chlorinated water

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Treated/potable and chlorinated water						
Essential Water						
Number of connections	815	815	815	815	815	815
Number of 20mm meter equivalents	2 234	2 234	2 234	2 234	2 234	2 234
CIE recommendation						
Number of connections	829	829	829	829	829	829
Number of 20mm meter equivalents	2 293	2 293	2 293	2 293	2 293	2 293

¹² For example, a 40mm water meter equals 4 times a 20mm water meter. The formula to calculate the 20mm equivalent is: $\frac{(\text{Size of water meter in mm})^2}{400}$

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Untreated/non-potable water						
Essential Water						
Number of connections	54	54	54	54	54	54
Number of 20mm meter equivalents	256	256	256	256	256	256
CIE recommendation						
Number of connections	54	54	54	54	54	54
Number of 20mm meter equivalents	253	253	253	253	253	253

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.1, CIE.

Mining sensitivity

Increased demand from the Cobalt Mine

Essential Water has not included water connections from the potential cobalt mine (Cobalt Blue) in its forecasts due to “high uncertainty regarding its likelihood and timing”. Two key questions are:

- the likelihood of mining commencement within the regulatory period, and
- the amount of mining water demand (at the mine site and in Broken Hill, if new workers come to town) during construction and ongoing operations.

We understand that (table 1.7):^{13 14 15}

- the Cobalt Blue Mine commissioned a pilot plant in early 2021 to replicate the process to extract cobalt from Pyrite Hill
- the Cobalt Blue Mine has now shifted toward constructing and operating a larger-scale Demonstration Plant to optimise Cobalt Blue’s proprietary processing technology which will deliver sufficient product to support qualification as a supplier to global battery makers
 - The Demonstration Plant will continue to operate over Q2 2022 to provide a larger scale and continuous operating baseline for BHCP Feasibility Study purposes, whilst simultaneously allowing further investor (debt and equity) assessment.
- a Final Investment decision is anticipated in Q1 2023, noting
 - Environmental Impact Statement submission and State Significant Development application outcome are anticipated in Q4 2022.

¹³ <https://cobaltblueholdings.com/broken-hill/broken-hill-cobalt-project/>

¹⁴ <https://cobaltblueholdings.com/assets/2263407.pdf>

¹⁵ <https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PDA-7%2120200120T225251.430%20GMT>

1.7 Broken Hill Cobalt Project (BHCP) development timeline

Calendar year	Project Development
2021	<ul style="list-style-type: none"> ▪ Feasibility studies, including pilot plant ▪ EIS field studies
2022	<ul style="list-style-type: none"> ▪ Feasibility studies, including large scale operations (demonstration plant) and first commercial qualification samples ▪ EIS field studies
2023	<ul style="list-style-type: none"> ▪ Final investment decision ▪ Feasibility studies, approvals, and DFS (definitive feasibility study) ▪ EIS field studies and SSD^a determination
2024	<ul style="list-style-type: none"> ▪ Construction period and mine development ▪ ESG/CO₂ reporting
2025	<ul style="list-style-type: none"> ▪ Refinery commission and start of operations ▪ ESG/CO₂ reporting and operating permits

^a State Significant Development.

Source: Cobalt Blue Company Presentation 2H 2021.

Essential Water has confirmed that they can supply the water requirements of the Broken Hill Cobalt Project using a pipeline between Broken Hill and the mine site. To date it is unknown how many 20mm meter equivalents the new Cobalt mine might require.

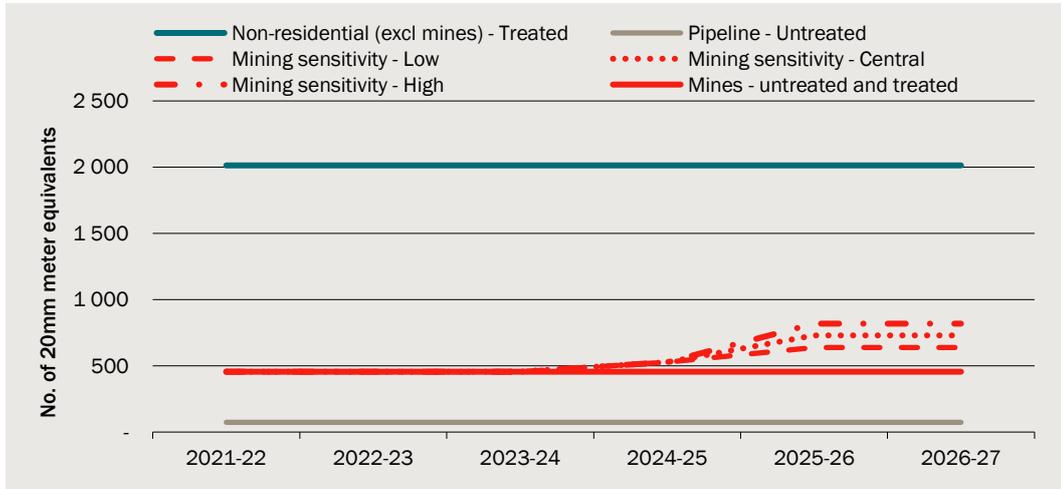
We note that we do not know how much water and how many connections Cobalt Blue might require during the construction phase and in the first years of operation, as well as whether the mine requires raw or treated water. Since the existing Perilya Ltd mine has a similar water demand as the proposed Cobalt Mine, we have used Perilya's number of 20mm meter equivalent connections as a reference point to apply our scenarios.

We have tested three scenarios for the demand of 20mm meter equivalent connections for the construction and operational time:

- 20 per cent during construction and 50 per cent during first of operation of the total potential demand,
- 20 per cent during construction and 75 per cent during first of operation of the total potential demand, and
- 20 per cent during construction and 100 per cent during first of operation of the total potential demand.

A summary of the projected number of connections for non-residential customers and the mining sensitivity is presented in chart 1.8.

1.8 Projected number of 20mm meter equivalents



Note: Mines receive treated and untreated water. However, we do not know whether the new mine will receive treated and untreated water or only treated/untreated water. Therefore, we have summed up the number of connection for mines.

Data source: CIE, Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx

Increased demand from construction and mining workers

We note that Essential Water has not undertaken any analysis that recognises the potential water demand of construction and mining workers from outside the region. According to a scoping report from January 2020, Cobalt Blue intends to employ 450 personnel during the construction phase and 260 full time equivalent positions during operation.¹⁶ In recent consultations with IPART, Cobalt Blue has indicated they intend to employ around 400 during both the construction and operational phase. Those workers are aimed to be drawn from the local community, if possible. For the purpose of this sensitivity we have used the most recent figures from the consultations.

As it is difficult to project where the mine will source its employment, we have used different scenarios. The mine will (if it reaches the construction and operational phase) employ 400 workers¹⁷:

- Low estimate – All 400 workers are sourced locally, which would not result in an increased in the residential water demand,
- Central estimate – A portion of those workers is sourced locally, while a small share are fly-in-fly-out workers and another small share moves to Broken Hill with their families, and
- High estimate – All 400 workers move to Broken Hill with their families.

¹⁶ Broken Hill Cobalt Project, Scoping report January 2020, p. 29, <https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PDA-7%2120200120T225251.430%20GMT>

¹⁷ We note that for both phases the number of the required workforce is similar, however, the workforce profile could be very different. This means during the construction phase more workers might come from outside Broken Hill (fly-in-fly-out) compared to the operational phase and vice versa.

Those scenarios imply different increases in the number of dwellings and population, as a fly-in-fly-out worker most likely does not have the same water demand as an occupied dwelling, while workers moving to Broken Hill with their families use the same amount of water on average as an occupied dwelling (table 1.9).

The central estimate is based on ABS Census data:

- Over 90 per cent of the mining employees in Broken Hill also live in the Broken Hill LGA
- Over 16 per cent of the total workforce are already in the mining and construction sector, implying that Cobalt Blue could source from the existing population in Broken Hill, and
- Other mining regions like Mudgee show that an increase in mining workers also leads to an increase in the number of families, indicating that workers coming from outside Broken Hill will most likely bring their families as well. This may be more relevant for the ongoing operational phase, rather than the construction phase (which is temporary by nature).

Therefore, we assume for the central estimate that Cobalt Blue will be able to source 90 per cent of its workforce in Broken Hill, while the rest comes from outside Broken Hill, either with permanent or as fly-in-fly-out workers.

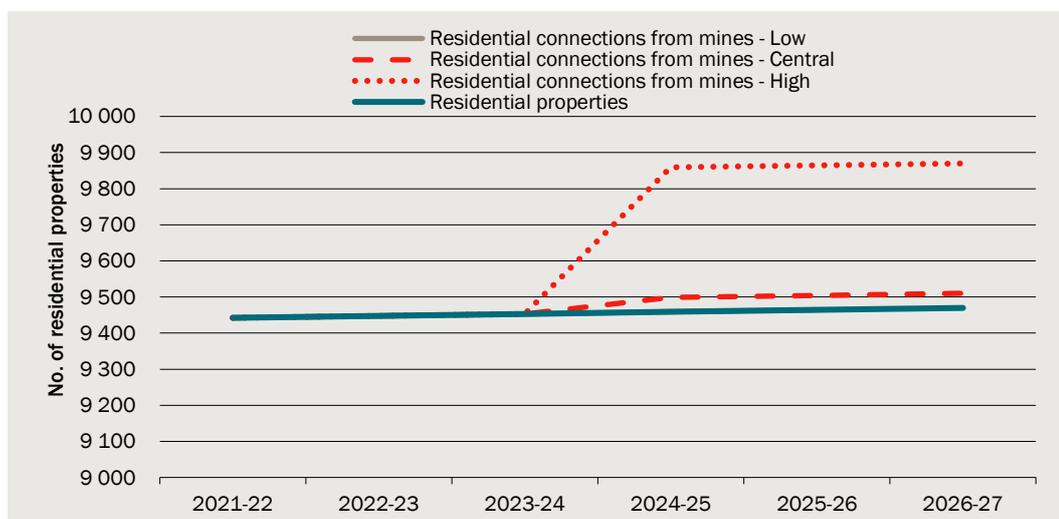
1.9 Summary of scenarios and implications

	Additional dwellings	Additional population
Low estimate (0% sourced outside)	no additional dwellings	no additional population
Central estimate (10% sourced outside)	5% come with their families	5% fly-in-fly-out
High estimate (100% sources outside)	100% come with their families	0% fly-in-fly-out

Source: CIE.

Chart 1.10 visualises the impact of each scenario on the total number of residential properties service with treated water in Broken Hill and Menindee. In the central estimate 40 new residential properties have to be serviced by Essential Water while in the worst case 400 new dwellings need to be supplied with treated water.

1.10 Total number of residential properties (treated water) – Mining sensitivity



Data source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.1, CIE.

Water demand

RECOMMENDATION

4 Non-residential water demand:

- a) Essential Water's assumption to keep total water usage constant and in line with actuals from 2020-21 is reasonable, given the actual numbers in previous years. We recommend adopting the same approach; however, we note that since Essential Water's pricing proposal submission in May 2021 the actual water usage for the financial year 2020-21 have slightly changed, which is reflected in our recommended figures.

5 Residential water demand:

Essential Water's forecast of residential treated water demand for Broken Hill and Menindee is based on PWA's IWCM analysis. It is our understanding that the water usage parameters are based on the consultant's average year estimate derived from a system level analysis of treated water production with modelled lawn irrigation.¹⁸

Chlorinated water demand for Silverton and Sunset Strip is kept constant in line with 2020-21 actuals.

- a) We recommend adopting a multivariate linear regression model using total rainfall per year, maximum temperature per year and water restriction dummies as explanatory variables for treated water demand per dwelling in Broken Hill and Menindee. Our per dwelling estimates are slightly higher and factor in the most recent lift off of water restrictions in Broken Hill.

¹⁸ PWA (2021), Essential Water, *Integrated Water Cycle Management Strategy Issues Paper*, p. 48

Based on the trend of the past 15 years we recommend using 2020-21 actuals for the chlorinated water demand in Silverton and Sunset Strip.

6 Proposed Cobalt Blue Mine:

- a) Essential Water's estimates do not include the newly proposed Cobalt Blue Mine. The new mine could represent a substantial increase in demand of up to 25 per cent. Due to the high uncertainty of the realisation of the mine and the current stage of the project, we recommend adopting Essential Water's approach and to not include an estimate for the proposed mine.
- b) However, we also recommend shortening the determination period to include the potentially significant demand from the proposed mine in the next pricing determination round.

Residential dwellings

Essential Water engaged PWA to conduct an IWCM analysis to estimate the annual demand per residential dwelling. The IWCM analysis assessed the impact of a range of factors on water consumption, including demographic trends, dwelling trends and climate.

Projected residential water demand is split into two main components:

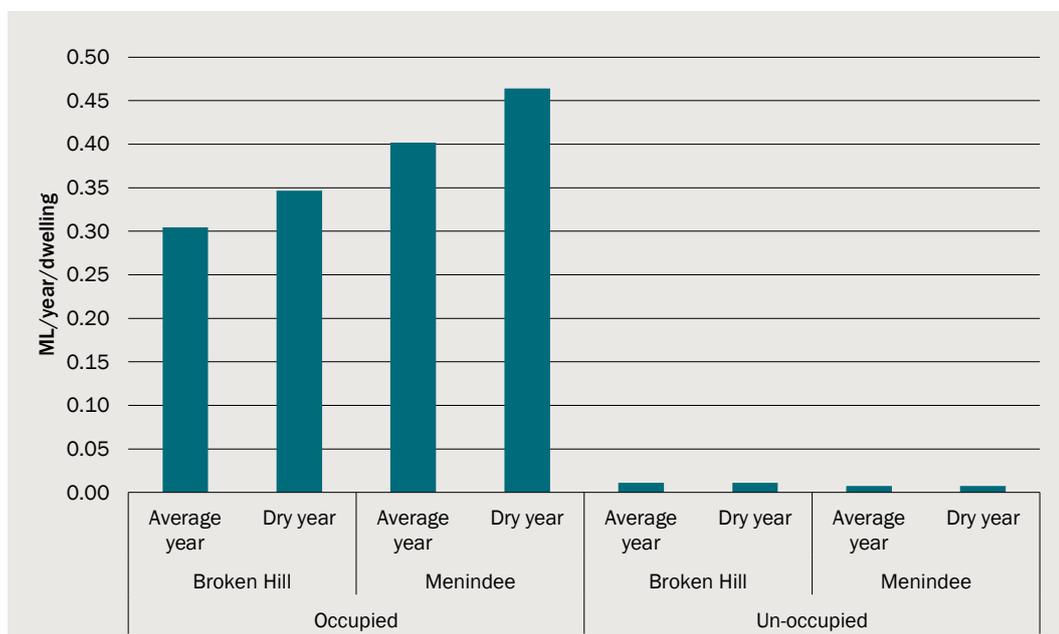
- treated/potable water delivered to residential properties in Broken Hill and Menindee, and
- chlorinated/non-potable water for Sunset Strip and Silverton.

Essential Water used estimates provided by PWA based on a system level analysis to project future water demand in Broken Hill and Menindee (chart 1.11), while water demand in Sunset Strip and Silverton is kept constant. We note that we have not been able to review the IWCM analysis.

Essential Water has stated that they have used the *average year* estimates for their treated water projections. This means:

- 0.304 ML/year for occupied and 0.011 ML/year for unoccupied dwellings in Broken Hill, and
- 0.402 ML/year for occupied and 0.007 ML/year for unoccupied dwellings in Menindee.

1.11 Unit demand estimates for treated water by climatic condition, region, and dwelling type



Data source: IWCM data.xlsx; Essential Water 2021, 'Essential Water Integrated Water Cycle Management Strategy: Issues Paper', p. 53, 71.

CIE water demand projections

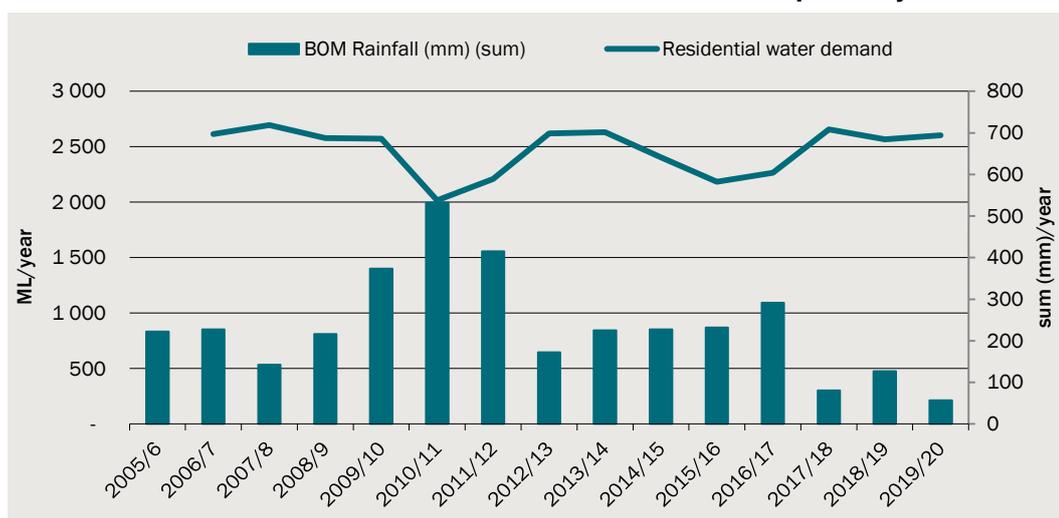
Total residential water demand is determined by the average water use per dwelling, per year, which in turn is a function of a variety of factors such as climatic conditions, demographic trends, prices, water quality and household behaviour:

- Climatic conditions including
 - Total precipitation in a year (chart 1.12), but also rainfall patterns and time since the last rainfall event
 - Persistent high temperatures or drought conditions
 - Global weather phenomena in particular the El Niño-Southern Oscillation, which has significant impacts on precipitation and temperatures
 - Water restrictions due to low storage levels and low rainfall
- Demographics trends
 - Ageing population
 - Decreasing population
 - Decreasing household size; smaller households are proportionally not more water efficient as larger households
- Water quality, which determines the demand for specific water uses (drinking, irrigating, cleaning etc.)
- Price elasticity of water demand
 - Residential water demand is assumed to be rather inelastic, however this can be split up into water demand for necessities (drinking, cooking, washing, showering etc.) and water demand for amenity or recreation (irrigating garden, car cleaning etc.)

- Individual/household behaviour

This means that forecasting future water demand in the short-term must consider a variety of determinants and can be best presented as worst- and best-case ranges.

1.12 Total residential treated water demand and rainfall in the past 15 years



Data source: BOM, Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.1, CIE.

We have estimated a linear regression model for historic water consumption per dwelling and per resident based on data since 2006-07 (table 1.13 and 1.14). The model quantified the impact of rainfall, temperature, and water restrictions on treated water demand for Broken Hill and Menindee.

1.13 Regression analysis output for annual treated water demand per occupied dwelling

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.1789	0.1023	1.7489	0.1109	-0.0490	0.4068
Max. temperature	0.0048	0.0023	2.0624	0.0661	-0.0004	0.0099
Total rainfall	-0.0002	0.0000	-6.4998	0.0001	-0.0003	-0.0001
Water restrictions	-0.0243	0.0079	-3.0801	0.0116	-0.0419	-0.0067

Notes: Adjusted R Square is 0.841486.

Data source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx, BOM, CIE.

1.14 Regression analysis output for annual treated water demand per resident

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.0540	0.0455	1.1866	0.2628	-0.0474	0.1553
Max. temperature	0.0023	0.0010	2.2018	0.0523	0.0000	0.0045
Total rainfall	-0.0001	0.0000	-5.4502	0.0003	-0.0001	0.0000
Water restrictions	-0.0079	0.0035	-2.2651	0.0470	-0.0158	-0.0001

Notes: Adjusted R Square is 0.803573.

Data source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx, BOM, CIE.

The following water demand parameters are based on those estimates and underpin our water demand projections (table 1.15):

1.15 Water demand parameter

Scenarios	Parameter
	ML/year
Per dwelling	
Central Case – occupied dwelling	0.34
Central Case – unoccupied dwelling	0.01
Dry year – occupied dwelling	0.39
Dry year – unoccupied dwelling	0.01
Wet year – occupied dwelling	0.26
Wet year – unoccupied dwelling	0.01
Per resident	
Average year – resident	0.13
Dry year – resident	0.15
Wet year – resident	0.10
Water restrictions sensitivity	
Water restrictions impact per dwelling	- 0.024
Water restrictions impact per resident	- 0.008

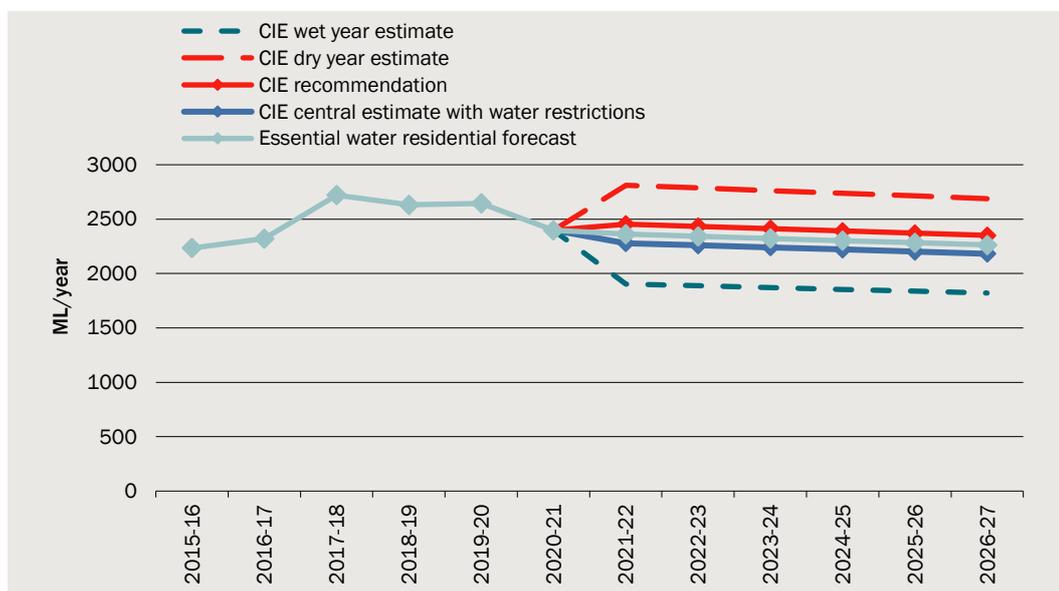
Source: CIE, Essential Water.

We estimate average demand per occupied dwelling slightly higher than Essential Water. Based on our recommendation for dwelling projections and our estimates for water demand per dwelling we have estimated different scenarios (chart 1.16):

- The central estimate represents our recommendation using our dwelling projections, average annual rainfall, and average annual maximum temperature since 2006-07 and no water restrictions.¹⁹ The estimate is close to the projections by essential water and differs by ~100 ML/year or +4 to 5 per cent.
- The dry and wet year estimates are based on a hypothetical year, i.e., for the dry year we choose a year with the lowest amount of rainfall and the highest maximum temperature and vice versa for the wet year. Those two extreme estimates represent an upper and lower bound.
- In addition, we have included a water restriction sensitivity. Based on the linear regression, per dwelling use during average rainfall and temperature conditions is 7 per cent less with water restrictions and per resident on average 6 per cent less. We note that usually water restrictions correlate with low rainfall and high temperatures as weather and climatic conditions determine storage levels to a high degree. Incorporating water restrictions in our central estimate might therefore overestimate the real consumption as rainfall and temperature are kept on average levels.

¹⁹ It is our understanding that water restrictions have been placed in the past two years and have been lifted in March 2021.

1.16 CIE projections of treated water demand in Broken Hill and Menindee



Data source: CIE.

Total residential properties in Sunset Strip and Silverton have been relatively constant since 2006-07 ranging between 169 and 176, while no obvious trend is observable. Total chlorinated water demand increased only slightly over the years. We recommend using the 2020-21 actual water demand and keeping it constant over the determination period.

1.17 Residential demand for treated and chlorinated water

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Treated/potable water						
Essential Water	2 362	2 342	2 323	2 303	2 283	2 263
CIE recommendation	2 469	2 448	2 427	2 406	2 385	2 364
Difference	+4.5%	+4.5%	+4.5%	+4.5%	+4.4%	+4.4%
Chlorinated/non-potable water						
Essential Water	43	43	43	43	43	43
CIE recommendation	40	40	40	40	40	40

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.1, CIE.

Non-residential connections

In accordance with forecasted numbers of non-residential customers, Essential Water has assumed that water demand remains the same as in 2020-21.

We recommend adopting this approach as water usage has been relatively stable in the past 15 years. However, since Essential Water's pricing submission in May 2021 the actual water demand for 2020-21 has slightly changed, which is reflected in our recommendation.

1.18 Non-residential demand for treated and untreated water

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Treated/potable water						
Essential Water	1 697	1 697	1 697	1 697	1 697	1 697
CIE recommendation	1 852	1 852	1 852	1 852	1 852	1 852
Untreated/non-potable water						
Essential Water	1 006	1 006	1 006	1 006	1 006	1 006
CIE recommendation	941	941	941	941	941	941

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.1, CIE.

Mining sensitivity

Increased demand from the Cobalt Mine

As noted above, Essential Water has not included the potential water demand increase during the construction and operational phase of the potential Cobalt Blue mine, due to “high uncertainty regarding its likelihood and timing”.

According to Cobalt Blue, their full operational water demand equates to 1.5GL/year of raw water²⁰, while different water sources can be used:

- Essential Water has already indicated that they have capacity of up to 1.8GL
- Cobalt Blue acquired a groundwater licence of up to 650ML.
 - However, as groundwater is often the costliest alternative for water sourcing due to pumping and treatment cost, the mine will mostly rely on the Water NSW pipeline.
- Cobalt Blue intend to use treated effluent for dust suppression.

We note that we do not know how much water Cobalt Blue might require during the construction phase and in the first years of operation. The water demand scenarios are based on CIE assumptions.

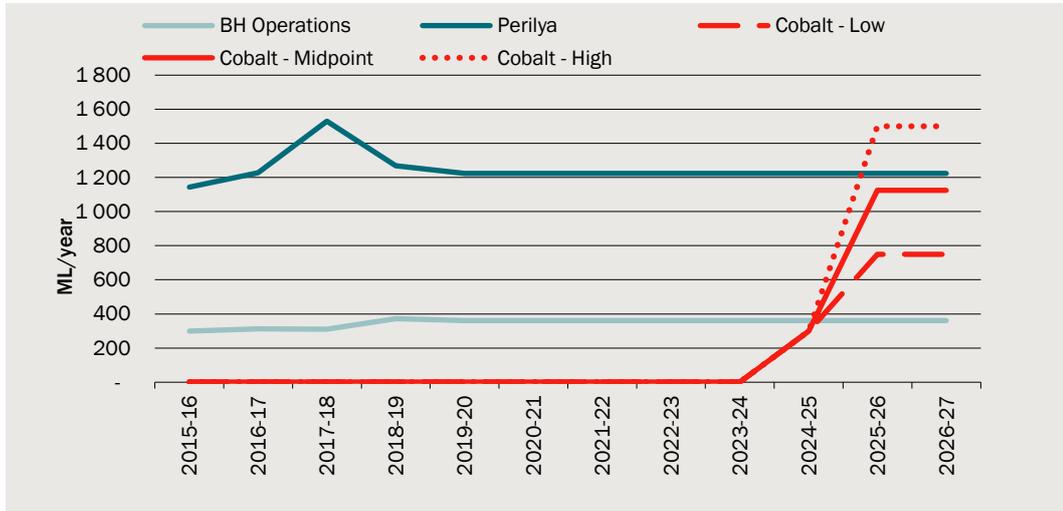
We have tested three scenarios for the construction and operational time:

- 20 per cent of the total annual demand during construction and 50 per cent during first of operation
- 20 per cent of the total annual demand during construction and 75 per cent during first of operation, and
- 20 per cent of the total annual demand during construction and 100 per cent during first of operation of the total annual demand.

The total potential demand of the Cobalt Blue mine and the existing mines is show in chart 1.19.

²⁰ Broken Hill Cobalt Project, Scoping report January 2020, p. 23,
<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PDA-7%2120200120T225251.430%20GMT>

1.19 Total treated and untreated water demand mining, by mine



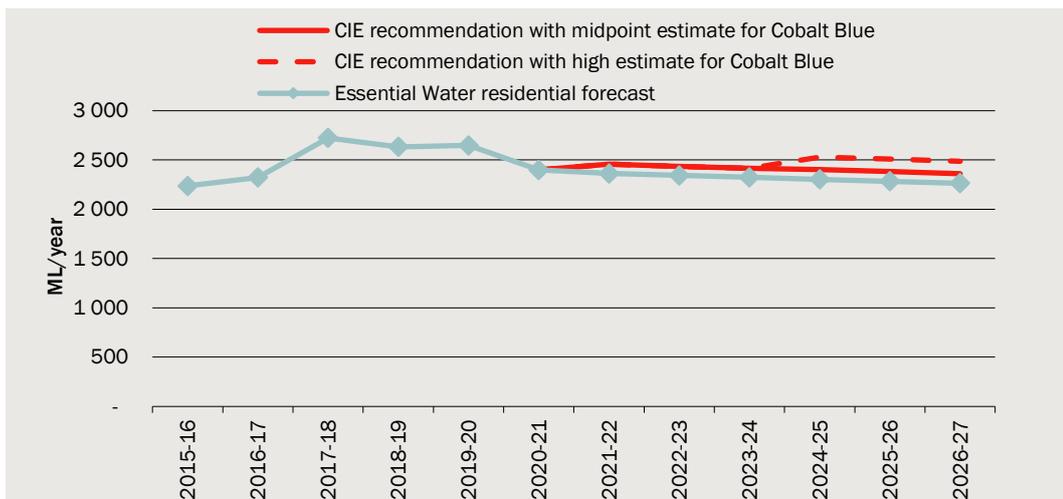
Data source: Essential Water, CIE.

Increased demand from construction and mining workers

Based on the three scenarios described in the dwelling projections, we have estimated the potential increased treated water demand from construction and mining workers.

The scenarios indicate that residential treated water demand will increase on average by 9ML/year in the central estimate, or up to 136ML/year in the high estimate, i.e., all workers are sourced from outside Broken Hill and bring their families. Chart 1.20 shows the CIE central estimate for treated water demand plus the potential additional residential water demand from mining and constructions workers.

1.20 Additional residential demand from mining



Data source: CIE.

Deemed sewerage

KEY POINTS

Essential water provides sewerage services only to Broken Hill while operating two sewage treatment plants in the North and South of Broken Hill. The treatment plant also receives sewage from mines and local businesses.

RECOMMENDATION

- 7 Non-residential connections and discharge volume
 - a) Essential Water proposes to keep the number of sewerage connections and discharge volume constant and in line with actuals from 2020-21. We recommend adopting the same approach; however, we note that since Essential Water's pricing proposal submission in May 2021 the actual discharge volumes for the financial year 2020-21 have slightly changed, which is reflected in our recommended figures.
- 8 Residential connections and average sewerage discharge volumes
 - a) Essential Water propose to increase the residential connection deemed sewerage discharge volumes from 90kL to 100kL per annum for the 2022 determination period, following their review which found that forecast average residential discharges are likely to be between 105kL and 110kL per annum.²¹ The review was undertaken by PWA in their IWCM analysis.
 - b) We recommend accepting Essential Water's proposition to increase the deemed discharge allowance to 100 kL per year. However, we note that Essential Water's estimate is very conservative as the implied discharge factor is approximately 40 per cent. This is significantly lower than discharge factors used by other water utilities to determine the discharge allowance.
- 9 Proposed Cobalt Blue Mine:
 - a) Essential Water's estimates do not include the newly proposed Cobalt Blue Mine. The new mine could represent an increase in non-residential discharge of up to 4 per cent. Due to the high uncertainty of the realisation of the mine and the current stage of the project, we recommend adopting Essential Water's approach and to not include an estimate for the proposed mine.
 - b) However, we also recommend shortening the determination period in order to include the potentially significant demand from the proposed mine in the next pricing determination round.

²¹ Essential Water Pricing Proposal: Submission Page 10: CEO forward We propose to largely maintain our existing price structure as it is efficient and generally supported by customers. In a follow up information request, Essential Water later confirmed that the 105-110kL figures quoted in their Pricing Submission were based on earlier IWCM data.

Residential sewerage connections and discharge volume

Essential water provides sewerage services only to Broken Hill and proposes to increase the deemed sewerage discharge volumes from 90kL to 100kL per annum for the 2022 determination period. According to Essential Water, this is based on the PWA's IWCM analysis which indicates that the discharge to be between 105kL and 110kL per annum.²²

We note that the IWCM analysis uses equivalent tenements instead of residential connections as a reporting unit. In addition, we have doubts around the reported equivalent tenements figures in the tables S6, S7, 8-11, and 8-12 in the IWCM report. That is, occupied/active and unoccupied/inactive dwellings were not converted into equivalent tenements using the parameter assumptions reported in table 8-4.²³

The IWCM analysis estimated the deemed sewerage discharge volumes based on the average dry weather flow, i.e., the average sewage inflow on a dry day measured at a sewage treatment plant. In addition, PWA estimated discharge to sewer per dwelling based on billing data and customer information, which results in the following estimates:²⁴

- 0.35kL/day for occupied/active dwellings, and
- 0.03kL/day for unoccupied/inactive dwellings.

Our projections of the total number of dwellings and residential billable entities connected to the sewerage system differ only marginally from Essential Water's projections (table 1.21).

1.21 Residential dwellings connected to sewerage

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Total number of dwellings						
Essential water	9 047	9 049	9 051	9 053	9 055	9 057
CIE recommendation	9 046	9 049	9 052	9 055	9 058	9 061
Total number of residential billable entities						
Essential water	9 375	9 377	9 379	9 381	9 383	9 385
CIE recommendation	9 374	9 377	9 380	9 383	9 386	9 389

Note: Total number of residential billable entities differs from the total number of dwellings as units and flats are counted on average as four billable entities.

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.2 and 1.3, CIE.

²² Essential Water Pricing Proposal: Submission Page 10: CEO forward We propose to largely maintain our existing price structure as it is efficient and generally supported by customers. In a follow up information request, Essential Water later confirmed that the 105-110kL figures quoted in their Pricing Submission were based on earlier IWCM data.

²³ PWA (2021), Essential Water, *Integrated Water Cycle Management Strategy Issues Paper*; Table 8-4 reports that occupied dwellings are counted as 1 equivalent tenement and unoccupied dwellings as 0.09 equivalent tenements. Applying those parameters to the number of occupied and unoccupied dwellings stated in the report, the residential equivalent tenements amounts to 7898 equivalent tenements instead of 9 639 equivalent tenements in 2017.

²⁴ PWA (2021), Essential Water, *Integrated Water Cycle Management Strategy Issues Paper*; Table 8-4

We base our projection for the average sewerage discharge volumes per residential connections on the per dwelling estimates from the IWCM analysis and assume an occupancy rate in line with ABS projections (table 1.22).

1.22 Average sewerage discharge volume per residential connection

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
CIE recommendation	105.2	104.5	103.9	103.2	102.5	101.8

Source: CIE.

We recommend accepting Essential Water's proposition to increase the deemed discharge allowance to 100 kL per year. However, we note that Essential Water's estimate is very conservative as the implied discharge factor is approximately 40 per cent. This is significantly lower than discharge factors used by other water utilities to determine the discharge allowance. For example, Sydney Water²⁵ estimates an effective discharge factor of 68 per cent for houses and 94 per cent for apartments, and Hunter Water uses an average discharge factor of 75 per cent for houses and apartments to determine their discharge allowance.²⁶

Non-residential sewerage connections

Essential Water proposes to keep the number of connections and 20mm meter equivalents constant in line with 2020-21 actuals, while the potential increase in connections from the proposed Cobalt Blue mine is not factored in (table 1.23).

We recommend adopting this approach as the number of connections has been relatively stable in the past 15 years.

1.23 Non-residential sewerage connections (including exempt properties)

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Essential water						
Number of connections	677	677	677	677	677	677
Number of 20mm meter equivalents	1 652	1 652	1 652	1 652	1 652	1 652
CIE recommendation						
Number of connections	677	677	677	677	677	677
Number of 20mm meter equivalents	1 652	1 652	1 652	1 652	1 652	1 652

Source: Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx Table 1.2 and 1.3, CIE.

²⁵ IPART (2020), *Review of prices for Sydney Water*, p. 103, https://www.ipart.nsw.gov.au/sites/default/files/documents/final-report-review-of-prices-for-sydney-water-june-2020_0.pdf

²⁶ Hunter Water (2019), *Pricing of water, wastewater and stormwater services Technical Paper 8*, Figure 3.2, <https://www.hunterwater.com.au/documents/assets/src/uploads/documents/Other-Reports/Pricing-Proposal-Technical-Papers/Technical-Paper-08---Pricing-of-water-wastewater-and-stormwater-service.pdf>

As such, Essential Water also proposes to keep the non-residential discharge volume at the 2020-21 levels. We recommend using the same approach, however, since Essential Water's pricing submission in May 2021 the discharge volume has slightly changed, which is reflected in our recommendation.

1.24 Non-residential discharge volumes

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Essential Water						
Non-residential	249	249	249	249	249	249
Perilya Ltd	15	15	15	15	15	15
CBH Ltd	15	15	15	15	15	15
Exempt	280	280	280	280	280	280
CIE recommendation						
Non-residential	231	231	231	231	231	231
Perilya Ltd	29	29	29	29	29	29
CBH Ltd	15	15	15	15	15	15
Exempt	277	277	277	277	277	277

Source: Essential Water 2021, 'Essential Water Integrated Water Cycle Management Strategy: Issues Paper', Table 8-3 to 8.5, Report Number WSR 16095, January, pp. 80-82; 'Essential Water 2020 AIR_SIR_FY21 actuals update_14Oct2021.xlsx', Table 1.5; CIE.

Mining sensitivity

We have applied the same parameters and assumptions as in the water demand projection.

Those are that the mine will (if it reaches the construction and operational phase) employ 400 workers²⁷:

- Low estimate – All 400 workers could be sourced locally, which would not increase the residential water demand,
- Central estimate – A portion of those workers is sourced locally, while a small share are fly-in-fly-out workers and another small share moves to Broken Hill with their families,
- High estimate – All 400 workers move to Broken Hill with their families.

And sewerage discharge will be similar as Perilya, while we consider three scenarios:

- 20 per cent of the total annual discharge during construction and 50 per cent during first of operation,
- 20 per cent of the total annual discharge during construction and 75 per cent during first of operation, and

²⁷ We note that for both phases the number of the required workforce is similar, however, the workforce profile could be very different. This means during the construction phase more workers might come from outside Broken Hill (fly-in-fly-out) compared to the operational phase and vice versa.

- 20 per cent of the total annual discharge during construction and 100 per cent during first of operation.

The additional number of sewerage connections is shown in table 1.25. The additional discharge volume from the mine would range between 3 and 15 ML per year, depending on the uptake during construction and the first years of operation.

1.25 Mining sensitivity test

Type of connection/scenario	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Additional number of residential sewerage connections from mining and construction workers						
Low estimates	-	-	-	-	-	-
Central estimate	-	-	-	40	40	40
High estimate	-	-	-	400	400	400
Additional sewerage discharge connections from Cobalt Blue Mine construction and operation						
Low estimates	-	-	-	1	1	1
Central estimate	-	-	-	1	1	1
High estimate	-	-	-	1	1	1
Additional number of 20mm meter equivalents from Cobalt Blue Mine construction and operation						
Low estimates	-	-	-	25	25	25
Central estimate	-	-	-	25	25	25
High estimate	-	-	-	25	25	25

Source: CIE.

A Essential Water's and Water NSW's Broken Hill Pipeline customer and water demand forecasts

Essential Water

A.1 Essential Water forecast customer numbers for potable water (excl mines)

Number of customers	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Total population	17 819	17 652	17 485	17 318	17 152	16 974
Total residential billable entities	9 952	9 958	9 963	9 969	9 974	9 980
Number of non-residential customers	798	798	798	798	798	798
Number of non-residential customers 20mm meter equivalents	1 957	1 957	1 957	1 957	1 957	1 957

Source: Essential Water 2021, 'Pricing Proposal: Submission', table 24: forecast customer numbers for potable water (excl mines), p. 71, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-Proposal-by-Essential-Water-June-2021.PDF

A.2 Essential Water forecast sewerage customer numbers (excl mines)

Number of customers	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Total population	17 148	16 987	16 827	16 666	16 506	16 335
Total residential billable entities	9 375	9 377	9 379	9 381	9 383	9 385
Number of non-residential customers	675	675	675	675	675	675
Number of non-residential customers 20mm meter equivalents	1 602	1 602	1 602	1 602	1 602	1 602

Source: Essential Water 2021, 'Pricing Proposal: Submission', table 28: Forecast sewerage customer numbers (excl. mines), p. 72, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-Proposal-by-Essential-Water-June-2021.PDF

A.3 Essential Water forecast treated water sales (ML)

Consumption Volumes	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Residential	2 362	2 342	2 323	2 303	2 283	2 263
Non-residential (excl. mines)	305	305	305	305	305	305
Mines	1 055	1 055	1 055	1 055	1 055	1 055
Exempt customers	337	337	337	337	337	337
Total	4 059	4 040	4 020	4 000	3 981	3 961

Source: Essential Water 2021, 'Pricing Proposal: Submission', table 25: forecast treated water sales (ML), p. 71, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-Proposal-by-Essential-Water-June-2021.PDF

A.4 Essential Water forecast chlorinated water sales (ML)

Consumption Volumes	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Total chlorinated	43	43	43	43	43	43

Source: Essential Water 2021, 'Pricing Proposal: Submission', table 26Chlorinated water sales (ML), p. 72, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-Proposal-by-Essential-Water-June-2021.PDF

A.5 Essential Water forecast untreated water sales (ML/year)

Consumption Volumes	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Pipeline customers	70	70	70	70	70	70
Mines	520	520	520	520	520	520
Other non-residential	416	416	416	416	416	416
Total	1 006					

Source: Essential Water 2021, 'Pricing Proposal: Submission', table 29: forecast untreated water sales (ML/year), p. 72, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-Proposal-by-Essential-Water-June-2021.PDF

A.6 Essential Water forecast sewerage volumes (ML)

Consumption Volumes	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Residential ^a	844	938	938	938	938	939
Non-residential (excl. mines)	249	249	249	249	249	249
Mines	30	30	30	30	30	30
Exempt customers	280	280	280	280	280	280
Total	1 403	1 497	1 497	1 497	1 497	1 498

^a Deemed usage amount of 90kL in 2021-22 and 100kL in the 2022 determination period, multiplied by the forecast residential billable sewerage entities.

Note: Residential customers are charged a deemed sewerage usage amount - currently 90kL per annum multiplied by the sewerage usage price, which Essential Water propose to increase to 100kL per annum for the 2022 determination period.

Source: Essential Water 2021, 'Essential Water Pricing Proposal: Submission', table 25: Forecast non-residential sewerage volumes (ML), p. 73, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-Proposal-by-Essential-Water-June-2021.PDF; CIE.

Water NSW Broken Hill Pipeline

A.7 Water NSW Broken Hill Pipeline forecast customer and offtake numbers

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Essential Water	1	1	1	1	1	1
Offtakes	5	5	5	5	5	5
Total	6	6	6	6	6	6

Note: Water NSW currently has five offtakes (Kudgee Station, Netley Cattle Yards, Netley Station, Pinpoint /Sunnydale and Balaclava). Netley Cattle Yards and Netley Station are not taking any water and have not entered into a Water Agreement. All the other Offtakes are taking water. The Offtake Structure Pinpoint/Sunnydale is one structure but two customers who share the costs 50:50 for that offtake. Water NSW therefore refers to five offtakes with four offtake customers.

Source: Water NSW 2021, 'Pricing Proposal to the Independent Pricing and Regulatory Tribunal: Regulated prices for the Wentworth to Broken Hill Pipeline', pp. 65-66, June, https://www.ipart.nsw.gov.au/sites/default/files/cm9_documents/Pricing-proposal-by-Water-NSW-June-2021.PDF.

A.8 Water NSW projected annual pipeline bulk water transport volumes

Consumption Volumes	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
	ML	ML	ML	ML	ML	ML
Essential Water	5 596.3	5 574.7	5 553.1	5 531.5	5 509.9	5 488.1
Offtakes	2.8	2.8	2.8	2.8	2.8	2.8
Evaporation losses	435.3	435.3	435.3	435.3	435.3	435.3
Total	6 034.4	6 012.8	5 991.2	5 969.6	5 948.0	5 926.2

Source: Water NSW 2021, 'Attachment 4 – Water NSW (Pipeline) AIR/SIR 2021.



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