Pricing Proposal to the Independent Pricing and Regulatory Tribunal

Regulated prices for the Wentworth to Broken Hill Pipeline

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Chief Executive Officer Forward

WaterNSW is pleased to present this pricing proposal to the Independent Regulatory and Pricing Tribunal (IPART), for the inaugural pricing determination for the Wentworth to Broken Hill Pipeline.

Since our Board received a Direction under section 20P of the *State Owned Corporations Act 1989 (NSW)* (SOC Act) from the Minister for Lands and Water to construct, operate and maintain a pipeline from the Murray River at Wentworth to the township of Broken Hill, our organisation has been energised to deliver an outstanding piece of infrastructure that provides, finally, a secure water source for the people of Broken Hill.

This project has seen the mobilisation of hundreds of people across New South Wales and, in particular, along the route of the pipeline, the Silver City Highway. I personally have had the privilege of seeing our people and those of our contracting partners, the John Holland MPC Group Joint Venture, committed to the safe and timely construction of the pipeline in hot and difficult conditions. The broader team includes our commitment to meeting the NSW Infrastructure Skills Legacy Program bringing employment opportunities for, amongst others, learning workers, apprentices, women in construction and Aboriginal and Torres Strait Islander people.

In a short space of time, we have seen a significant section of the pipeline installed and this pricing proposal has sought to share some of these images with you. I look forward to the pipelines' progress until it is capable of delivering water to Essential Water's water treatment plant, to meet the needs of the residents of Broken Hill.

This pricing proposal sets out the total projected cost of the project to WaterNSW, through a regulated asset base of $458 million and our illustrative averaged revenue requirement of $30.8 million (18-19 real dollars) per annum over the proposed 4 year term of the determination.

Our primary customer for the pipeline is Essential Energy (trading as Essential Water), for whom we are proposing predominately fixed charges, reflecting the cost of the construction of the pipeline, with approximately 8% comprising variable charges reflecting power costs to transport water through the pipeline.

IPART will be conducting the pricing determination process for Essential Water concurrently with the process for this proposal. We understand Essential Water will be seeking assistance from the NSW Government in meeting our proposed charges and the NSW Government has already publicly committed to meeting a large proportion of these costs, namely the costs of constructing the pipeline and, at the determination of IPART, a share of the ongoing operation and maintenance costs of the pipeline.

We also anticipate servicing a small number of customers along the route of the pipeline who are local pastoralists. They will be able to receive raw water through offtakes in the pipeline installed close to their properties. Their charges will also be predominately fixed, reflecting the cost of installation of the offtakes to service their properties, with a variable charge reflecting the cost of transporting water through the pipeline.

We look forward to the engagement process on this proposal and to be able to commence providing this important service to the local community.

David Harris
Chief Executive Officer

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1. Executive summary

The Board of WaterNSW received two directions under section 20P of the SOC Act from the New South Wales Minister of Lands and Water, one in November 2016 and one in August 2017, in relation to the construction, operation and maintenance of a pipeline to deliver low salinity raw water from the Murray River to Essential Water's Mica Street water treatment plant in Broken Hill, which is to run along the route of the Silver City Highway (the pipeline).

Since receiving those directions, described in greater detail in section 3.1 of this proposal, and to ensure compliance with those directions, following a competitive tender process WaterNSW engaged contractors to commence construction of the pipeline and as at the date of this pricing proposal, construction is in full swing.

This pricing proposal to IPART is for the inaugural pricing determination by IPART for the pipeline and is intended to apply to the monopoly services delivered by the pipeline, namely the transportation of water from the Murray River via the pipeline.

WaterNSW is proposing a regulatory pricing framework based on a regulated asset base, with an opening value of $458 million (18-19 real dollars), and price caps. We are proposing an initial term for the determination of four years (1 July 2019 to 30 June 2023) and are seeking an illustrative average revenue requirement of $30.8 million (18-19 real dollars), based on 5,746ML of average usage per annum, across the four years of the determination.

Our primary customer for the pipeline is Essential Energy (trading as Essential Water). We will be seeking to recovery our charges from Essential Water predominately through a fixed tariff, reflecting the fixed capital costs of the pipeline. Approximately 8% of charges will be variable, primarily reflecting electricity costs in transporting water through the pipeline.

As required by our direction, the pipeline is scheduled to provide "first water" as soon as December 2018, with its completion scheduled in April 2019. We have structured our agreement with Essential Water and this pricing proposal such that the charges determined by IPART will apply if they need to be incurred prior to IPART's determination.

This pricing proposal also includes prices for a small number of offtakes to be installed along the length of the pipeline. These offtakes will service local pastoralists adjacent to the pipeline. We are proposing charges that will also be predominately fixed, reflecting the cost of installation of the offtakes to service their properties, with a variable charge reflecting the cost of transporting water through the pipeline.

2. The Role and Functions of WaterNSW

2.1 What we do?

WaterNSW is Australia's biggest water supplier. We own and operate 42 dams across New South Wales (NSW), as well as hundreds of weirs and regulators and a small number of pipelines. We supply and deliver water through our infrastructure and the State's river systems to our customers, including Sydney Water, farmers, irrigators, regional towns and industry.

WaterNSW supplies and seeks to improve availability of water that is essential for water users and communities throughout NSW:

- **Source water protection** – protection of the Greater Sydney drinking water catchment to ensure safe water is supplied to Sydney Water, local councils and other distributors for treatment and distribution to their customers

- **Bulk water supply** – supplying water from its storages to customers in the Greater Sydney drinking water catchment and in the state's regulated surface water systems

- **System operator** – efficient management of the state's surface and groundwater resources to maximise reliability for users through the operation of the state's river systems and bulk water supply systems. This is done in collaboration with the Murray Darling Basin Authority, which directs operations of the Murray River system

- **Bulk water supply infrastructure planning, delivery and operation** – meets customer-defined levels of service consistent with NSW Government policy and priorities to increase the security and reliability of water supplies to customers and communities in NSW

- **Customer water transactions and information services** – provides efficient and timely services to customers for water licensing and approvals, water trades, billing and to meet their water resource information needs for surface and groundwater quantity and quality.

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2.2 Our structure and purpose

The *Water NSW Act 2014 (NSW)* (WaterNSW Act) came into effect on 1 January 2015, thereby creating WaterNSW as a statutory state owned corporation under that Act.

WaterNSW further increased its scope on 1 July 2016 when the *Water NSW Amendment (Staff Transfers) Act 2016* took effect to facilitate the transfer of employees of the then Department of Primary Industries - Water to WaterNSW. This enabled WaterNSW to carry out delegated functions[1] of the Water Administration Ministerial Corporation in relation to water delivery, customer transactional dealings, in-field services and resource management for groundwater, regulated and non-regulated surface water.

The principal objectives of WaterNSW set out in section 6 of the WaterNSW Act are:

a) to capture, store and release water in an efficient, effective, safe and financially responsible manner, and

b) to supply water in compliance with appropriate standards of quality, and

c) to ensure that declared catchment areas and water management works in such areas are managed and protected so as to promote water quality, the protection of public health and public safety, and the protection of the environment, and

[1] The delegations are contained in Schedule A of the WaterNSW Operating Licence 2017-2022.

d) to provide for the planning, design, modelling and construction of water storages and other water management works, and

e) to maintain and operate the works of Water NSW efficiently and economically and in accordance with sound commercial principles.

The other objectives of WaterNSW, set out in section 6(2) of the WaterNSW Act are of equal importance but are not as important as the principal objectives of WaterNSW. They are:

a) to be a successful business and, to that end:
(i) to operate at least as efficiently as any comparable business, and
(ii) to maximise the net worth of the State's investment in Water NSW,

b) to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates,

c) to exhibit a sense of responsibility towards regional development and decentralisation in the way in which it operates,

d) where its activities affect the environment, to conduct its operations in compliance with the principles of ecologically sustainable development contained in section 6 (2) of the Protection of the Environment Administration Act 1991.

2.3 Our Operating Licence

WaterNSW operates in accordance with its operating licence granted under section 11 of the WaterNSW Act. The term of the current operating licence is 1 July 2017 to 30 June 2022. The operating licence authorises WaterNSW, within its Area of Operations (the whole of the State of NSW):

a) to capture and store water and to release water:
i) to persons entitled to take the water, including release to regional towns; and
ii) for any other lawful purpose, including the release of environmental water;

b) to supply water to Sydney Water;

c) to supply water to water supply authorities and to local councils or county councils prescribed by the Regulations;

d) to supply water to persons referred to in section 7(1)(d) of the Water NSW Act;

e) to supply water to other persons and bodies, but under terms and conditions that prevent the person or body concerned from supplying the water for consumption by others within the State unless the person or body is authorised to do so by or under an Act;

f) to construct, maintain and operate Water Management Works (including providing or constructing systems or services for supplying water);

g) to protect and enhance the quality and quantity of water in Declared Catchment Areas;

h) to manage and protect Declared Catchment Areas and Water Management Works vested in or under the control of Water NSW that are used within or for the purposes of such areas;

i) to undertake research on catchments generally, and in particular on the health of Declared Catchment Areas; and

j) to undertake an educative role within the community.

2.4 Our regulated and non-regulated services

WaterNSW's monopoly services are the subject of three separate IPART price determinations:

- the services we supply to Sydney Water and some councils and minor customers in the Greater Sydney area are subject to the IPART Determination – *WaterNSW, Maximum prices for water supply services from 1 July 2016 in relation to Sydney Catchment Functions, June 2016*

- the services we supply to irrigators, regional councils, mines, energy companies and environmental water holders in rural areas are subject to the IPART Determination – *WaterNSW, Prices for rural bulk water services from 1 July 2017, June 2017*

- the services we supply under our conferred WAMC functions are subject to the IPART Determination – *Water Administration Ministerial Corporation, Maximum prices for Water Management services from 1 July 2016*. We share this revenue with the Department of Industry - Lands and Water and, most recently, with the Natural Resources Access Regulator, who share responsibility for the delivery of some of these conferred functions with WaterNSW.

WaterNSW also supplies non-monopoly services such as leasing some of our facilities and certain commercial hydrometrics services.

This pricing proposal relates to new monopoly services in respect of the pipeline and will be subject to a separate, additional IPART determination under the *Independent Pricing and Regulatory Tribunal Act 1992 (NSW)* (IPART Act). [2]

[2] The water charge rules under Part 4, Division 1 of the Water Act 2007 (Cth) do not apply, as section 91(3) of the Act provides that the Division does not apply to charges in respect of urban water supply activities beyond the point at which the water has been removed from a Basin water resource. Under sub-section 91(1)(b) offtake customers (stock and domestic) are not prescribed by the regulations (1.05A) as the water must be made available through a bulk water service, that is, one provided for the delivery of water is primarily delivered on-river. Under sub-section 91(1)(d) offtake customers are not of a kind prescribed by the regulations (4.01A) as they relate to an urban water supply network – water service infrastructure that is operated primarily for delivering water for an urban water supply activity beyond the point at which the water has been removed from a Basin water resource.

3. The Wentworth to Broken Hill pipeline

3.1 Directions to the Board of WaterNSW

On 21 November 2016, The Hon. Niall Blair, the Minister for Lands and Water, with approval of the Treasurer, in pursuance of section 20P of the SOC Act, made the *Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016* (the Pipeline Direction) (Attachment A). The Board of WaterNSW was, amongst others things, directed to:

- arrange for the construction, operation and maintenance of a pipeline from the Murray River to deliver low salinity raw water to the existing Mica Street Water Treatment Plant in Broken Hill, including any associated infrastructure necessary for operation such as new or upgraded distribution pipelines or pump stations. The pipeline is to generally run along the Silver City Highway road easement

- use best endeavours to ensure that supply from the pipeline, when used in conjunction with the current Broken Hill water supply infrastructure, can meet peek daily demand of up to 37.4 mega-litres (MLs) of water per day

- use best endeavours to make the pipeline operational by December 2018, and notwithstanding this, ensure that the pipeline is fully operational before all surface water and the Lake Menindee groundwater source available to the Broken Hill community are depleted

- fund the capital costs for constructing the pipeline from within WaterNSW's existing resources or otherwise borrow the required funds, recognising that IPART will be asked by the Government to allow WaterNSW to recover the total efficient costs associated with the ongoing operation of the pipeline, including the cost of capital.

On 31 August 2017, The Hon. Niall Blair, the Minister for Regional Water, with approval of the Treasurer, in pursuance of section 20P of the SOC Act, made the *Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017* (the Construction Direction) (Attachment B). The Board of WaterNSW was directed to ensure that:

- the minimum targets set in the NSW Infrastructure Skills Legacy Program are met for the construction of the pipeline, in consultation with the Department of Industry to the extent possible given the remote location of the project and with relevant targets negotiated through the tender process

- Australian rolled steel is substantially used in the construction of the pipeline, regardless of where the pipe is manufactured.

3.2 Subsidiary

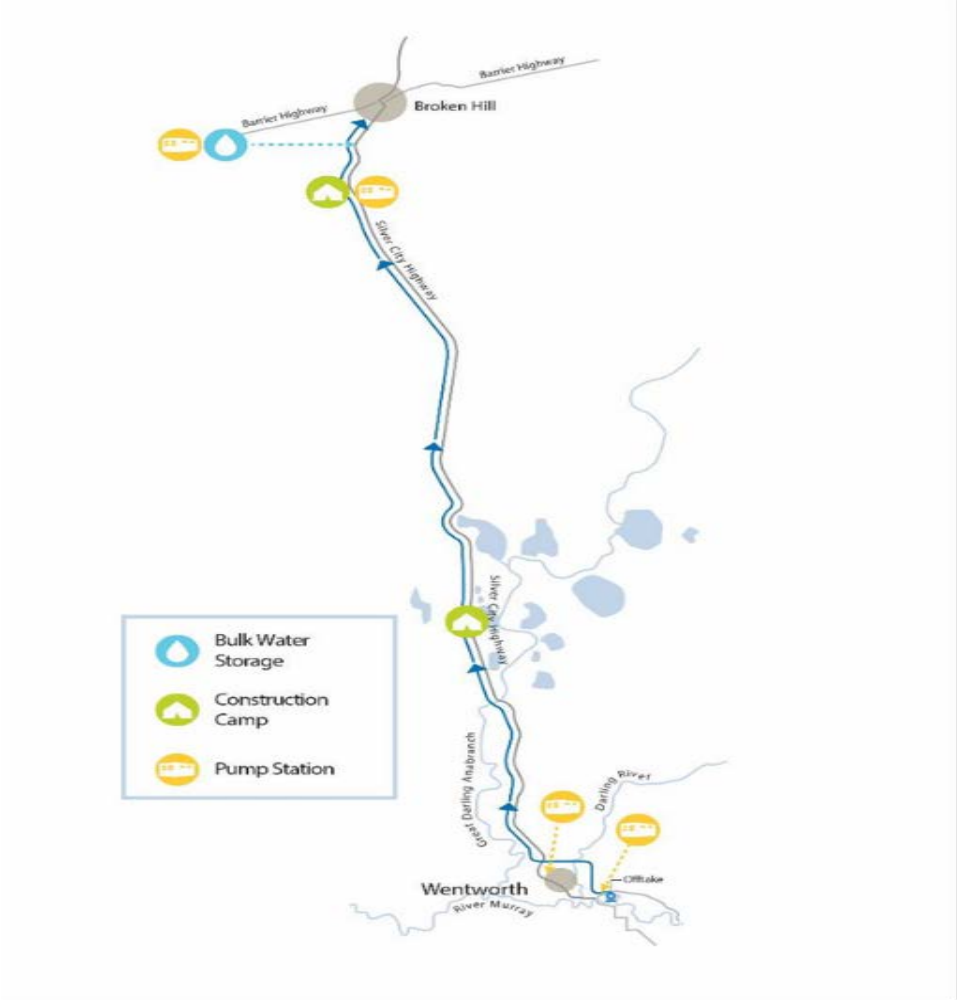
To ensure full ring-fencing of costs and responsibility for the project, the Board of WaterNSW has approved the formation of a wholly owned proprietary company limited by shares under the *Corporations Act 2001* (Cth) to construct, operate and maintain the pipeline. The subsidiary, or special purpose vehicle (SPV), will be incorporated after the date of submission of this pricing proposal.

It is intended that the primary contracts for the pipeline (Design and Construct (D&C) and Operations and Maintenance (O&M)) will then be novated to the SPV.

This pricing proposal is for IPART to set prices to be charged for the pipeline by the SPV on behalf of WaterNSW.

This document refers to WaterNSW and not the SPV. Generally, references to WaterNSW for events to occur after the date of novation of the primary contracts, are references to the SPV acting on behalf of WaterNSW.

Figure 1 Schematic of the pipeline



3.3 Passing through efficient costs

On 19 April 2018, the Hon. Niall Blair, the Minister for Regional Water, with approval of the Premier, made the *Direction to the Independent Pricing and Regulatory Tribunal in relation to the construction and operation of the Broken Hill pipeline 2018* (Attachment C).

This directed IPART, when making determinations of pricing for the Services, to include an amount or factor in its methodology representing the cost of complying with the Pipeline Direction and the Construction Direction. Services means the services that are supplied by WaterNSW by means of or in connection with the Murray River to Broken Hill pipeline and declared to be government monopoly services for the purposes of the IPART Act.

4. Overview of the pipeline project

Figure 2 Construction Camp

4.1 Expression of Interest process

Following receipt of the Pipeline Direction, WaterNSW commenced activities including obtaining a handover of material from the Department of Industry, updating design and preliminary costings, initiation of environmental and cultural heritage surveys, preparing the procurement strategy, market soundings, risk assessment, preliminary risk allocation and preparation of key commercial terms.

Then on 5 April 2017, WaterNSW formally commenced an Expression of Interest (EOI) process for the construction and maintenance of the proposed pipeline. Prospective tenderers were requested to outline their relevant experience, financial capacity, consortium structure, key individuals and high-level approach to completing the project.

The primary purpose of the pre-qualification/EOI phase was to maximise competition during the Request for Tender (RFT) stage by ensuring that all tenderers had the necessary experience and capacity to undertake the project, so that they could be confident that they had a good chance of success - thus providing an incentive to invest more into providing a detailed and comprehensive tender response. It was important to ensure respondents to the RFT invested in detailed designs as part of their tender responses as different designs would produce different whole of life cost outcomes, with WaterNSW looking for the least cost whole of life cost outcome.

Ten EOI submissions were received on 28 April 2017 and were evaluated. Three were non-compliant with the EOI terms and conditions, leaving seven for detailed evaluation. The EOI process was designed to shortlist four tenderers. The four proponents with the highest evaluation scores were shortlisted to take part in the RFT stage.

The four shortlisted tenderers arising from the EOI process were:

- Silver City Water Partnership, a joint venture between Downer Utilities Australia Pty Limited and Spiecapag Australia Pty Ltd (Downer Spiecapag JV)

- John Holland Pty Ltd with partners MPC Group Pty Ltd and TRILITY Pty Ltd (JHJV)
- McConnell Dowell Constructors (Aust) Pty Ltd with partner Acciona Agua Australia Pty Ltd (McConnell Dowell)
- UGL Engineering Pty Ltd with partner Veolia Water Operations Pty Ltd (UGL).

4.2 Design of the RFT

The RFT was specifically designed to ensure that the project delivered a substantive value for money outcome for WaterNSW and for customers of the pipeline. This was achieved through a number of mechanisms built into the design of the RFT, set out below.

4.2.1 DBOM model

Through the RFT, WaterNSW structured the delivery of the construction of the pipeline and the maintenance for the first 20 years of the pipeline as a design, build, operate and maintain (DBOM) model.

This model means that the successful contractor is the single line of responsibility for both the D&C and O&M phases and incentivises the D&C contractor to design and construct an asset which minimises whole of life costs (as they will bear the responsibility for operating costs and risks).

This model ensures the contractor's goals are aligned to those of WaterNSW, in that the delivered solution will deliver an effective technical solution, be competitive and efficient on a whole of life basis.

4.2.2 Pricing pro-forma

The RFT required tenderers to complete a detailed pricing pro-forma which required disclosure of:

- a detailed breakdown of the D&C cost of the project into pre-defined components and sub-components
- details of any D&C components purchased in a foreign currency and the relevant exchange rates
- a detailed breakdown of all items comprising the O&M cost and the flexibility to adjust operating scenarios (e.g. water demand) to test the impact of the scenarios on this cost
- a detailed breakdown of asset replacement costs expected to be incurred over the life of the project.

This level of detail provided a high level of transparency in relation to the elements which comprised the tenderer's price, encouraging competition and efficiency in all aspects of pricing (as cost discrepancies between components would be identifiable). This level of detail would also constrain the contractor's ability to seek future price increases.

4.2.3 O&M term

The O&M term specified in the RFT consisted an initial 10 year period as well as options, for WaterNSW, to extend the O&M contract for up to two consecutive periods of 5 years after the initial period expires (i.e. 10+5+5).

This term structure provides the following advantages over shorter term alternatives:

- shorter O&M terms typically have reduced maintenance and lifecycle obligations relative to longer terms and therefore weaken the incentive for the contractor to design and build an asset which minimises whole of life costs
- a longer O&M term increases the aggregate value of the O&M contract and therefore is likely to attract greater market appetite and competition
- the longer the total term of the contract, the greater price certainty WaterNSW will have (where the price is locked in at a time where competition is greatest, i.e. during the tender for the DBOM contract)
- a longer initial O&M term provides operators with a greater time period over which to recover their bid costs and the longer total term (taking into consideration the optional extensions) means that any retender costs associated with the contract are deferred for longer for both parties involved.

In the lead up to the end of year 10 and year 15, WaterNSW will market test the existing O&M price and, if the existing price is considered to be above the market rate, WaterNSW has the following options under the O&M contract:

- end the contract (i.e. do not extend the contract) and retender the O&M contract; or
- negotiate with the contractor to reduce prices in line with the market testing and then extend on the revised prices.

Both of the options above will result in a realignment of the O&M price with that of a competitive market price. The market testing and retender (if required) would be commenced in time to allow for a smooth transition between contract terms.

Alternatively, if the market testing results indicate that the existing O&M prices are in line with the market or lower, WaterNSW can extend the contract on the existing prices contained in the O&M contract.

In addition, at any time during the term, where WaterNSW determines that its current O&M price is above the market rate (via market testing or otherwise), it has the ability to terminate the O&M contract and retender. Upon the decision to terminate, WaterNSW will be liable to pay for the contractor's demobilisation and other reasonable and unavoidable costs directly incurred by the contractor as a result of termination and a predetermined amount representing loss of opportunity and loss of profit of the contractor.

4.2.4 Power supply

Under the O&M contract, the contractor will be paid based on its forecast energy volumes applied to pricing according to its agreement with an energy retailer (Power Supply Agreement (PSA)).

During the tender process, the forecast energy volumes were bid back by tenderers in volumetric bands based on the volume of water to be delivered to Essential Water. The volumetric bands allowed tenderers the flexibility to incorporate bespoke operating and system efficiencies into the tender price (noting that gains from any additional operating efficiencies realised over the O&M term will be captured by the efficiency sharing mechanism outlined below).

The contractor is responsible for arranging and entering into a PSA throughout the term. To ensure competitive market rates, the contractor will be required to source three quotes and select the most competitive from these. Overall, this mechanism aims to produce the same competitive pricing outcomes that would be achieved if WaterNSW were to procure the PSA itself (i.e. it will uncover available market prices). WaterNSW will retain review powers over the electricity procurement process.

The Broken Hill energy retail market is not limited as there are approximately 15 energy retailers active in NSW. While it is expected that three quotes can be obtained, if three quotes cannot be sourced, the contract requires the contractor to source as many quotes as possible with the resulting price to be taken as competitive.

4.2.5 Efficiency sharing mechanism

The O&M contract is designed to motivate the contractor to find efficiency gains throughout the term and to share the benefit of those gains. To incorporate this principle, the O&M contract includes:

- a mechanism to share any benefits greater than $100,000 realised from any discrete changes in the operating regime or design of the project. That is, if during the term the contractor finds ways to improve the operating efficiency of the project, these gains would be shared 50/50 between the contractor and WaterNSW
- a mechanism to measure any energy cost savings realised by the contractor (calculated as energy payments less actual energy costs incurred) on an annual basis and share these savings 50/50 between the contractor and WaterNSW.

4.2.6 Efficiency saving factor

An additional efficiency enhancing mechanism included in the O&M contract is an efficiency saving factor that reduces fixed and variable costs by a percentage year on year, reflecting the contractors assumed ability to improve operating efficiency throughout the term.

4.2.7 Asset replacement costs

Over the O&M contract term, the contractor will be paid based on the lower of actual asset replacement costs incurred and the cumulative asset replacement cost profile bid by the contractor in its tender (adjusted for indexation).

In establishing the amount of actual asset replacement costs incurred, the O&M contract requires the contractor to demonstrate that the relevant invoices have been paid, the relevant work has been completed and certified and all asset replacement services are consistent with the Asset Management Plan (which is agreed annually with WaterNSW).

Overall, this mechanism both ensures that the contractor is held accountable to their bid price and that WaterNSW only pays for asset replacement services actually required.

4.3 RFT process

On 8 June 2017, WaterNSW issued the RFT to the four shortlisted tenderers, with 29 August 2017 the closing date for tenders.

The strategies employed through the tender process to increase competition included:

- building market appetite and interest through industry briefings and engagement
- promoting a level playing field through strict probity practices
- holding interactive workshops with tenderers to provide ongoing feedback to ensure that each final tender would be competitive and meet project requirements.

A schedule of the interactions held during the tender process is set out in Table 1 Schedule of Interactions below.

Table 1 Schedule of Interactions

Milestone	Indicative date
Release of RFT	8 June 2017
Access granted to Project Data Room	The date the Tenderer returns a duly executed Deed of Disclaimer
Briefing meeting	16 June 2017
Site inspections	22 – 23 June 2017
Interactive workshops	26 June 2017 – 17 August 2017
Interim Tenderer submission of Project Documents departures	24 July 2017
WaterNSW reissue of Project Documents	4 August 2017
Closing date for Tenders	29 August 2017

4.4 Tender evaluation

The four shortlisted tenderers arising from the EOI process each submitted a conforming and complete tender[3].

The WaterNSW evaluation committee (including external experts) conducted a detailed review of the tenders. Different criteria of the bids were provided with different evaluation weightings as set out in Table 2 Evaluation Weightings below.

Table 2 Evaluation Weightings

Evaluation Criteria	Weighting
Design	15%
Delivery	10%
Operations	10%
Commercial Solution	5%
Financial Capacity	Pass / Fail
Price	60%

On 4 September 2017, the tenderers presented the main features of their proposals to the tender evaluation committee. By 19 September 2017, the evaluation committee shortlisted the two tenderers with the highest scores based on the criteria and weightings set out in Table 2 Evaluation Weightings above. The price differential between the two highest scoring tenderers and the other two tenderers was of such significance that it was considered unlikely that the lower scoring tenderers could overcome that differential. Therefore, the two higher scoring tenderers were shortlisted and all the tenderers were notified of this on 21 September 2017.

Upon shortlisting, the two highest scoring tenderers were requested to engage in face-to-face meetings on 22 September 2017. The primary focus of the meetings was to provide the

[3] No alternative tenders or options proceeded to evaluation as only limited information was provided in respect of any proposed alternatives and it was considered that none would deliver improved outcomes in relation to project objectives.

opportunity for the shortlisted tenderers to work with the evaluation committee to clarify and resolve any outstanding issues, in particular departures from WaterNSW's project documents. Beyond this meeting, the evaluation committee continued to actively negotiate with both shortlisted tenderers until such a time that the committee was confident that contract close would be achieved with a preferred tenderer within the project timeframe (mid-October 2017).

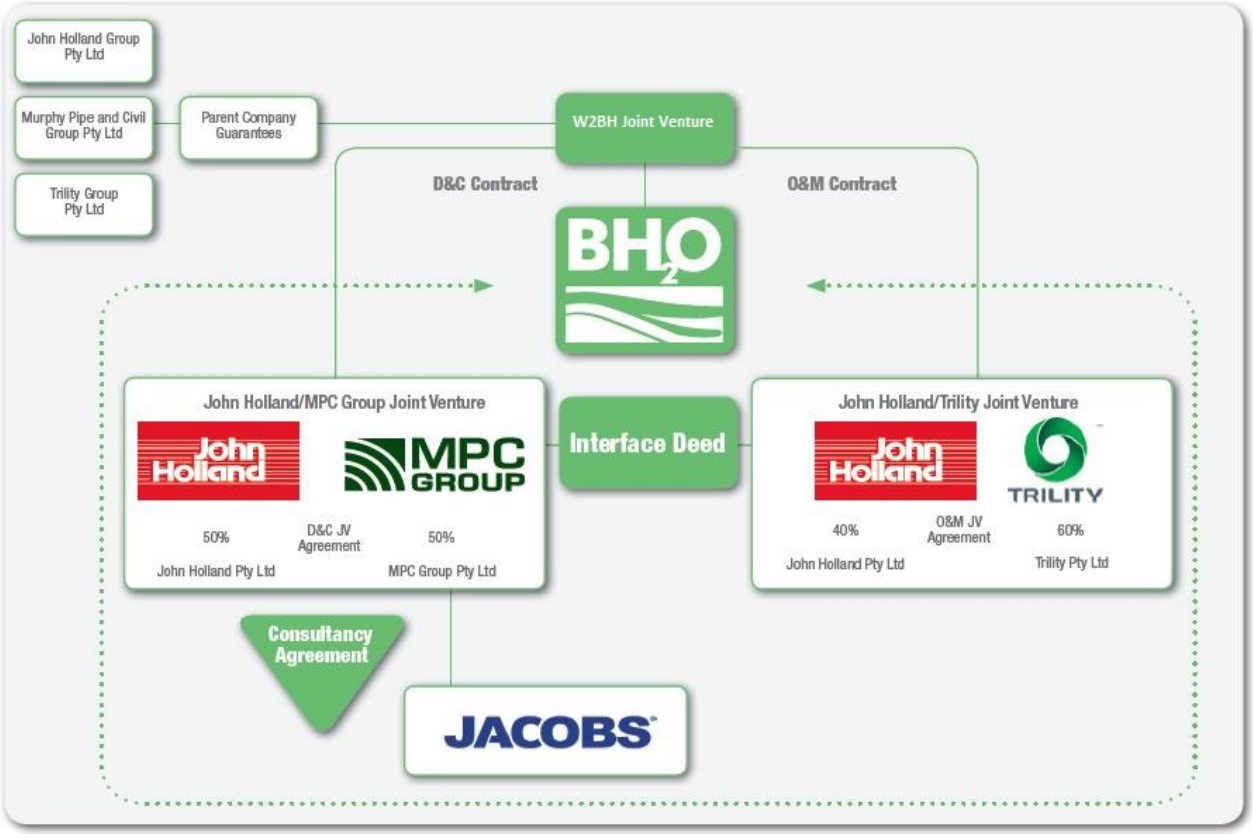
On 12 October 2017, WaterNSW provided separate revised final drafts of the D&C contract, O&M contract and output specification to the shortlisted tenderers. These contracts included the relevant tenderers requested departures to the extent they were acceptable to WaterNSW. The output specification was based on the original RFT with amendments to incorporate elements of the relevant tenderers technical solution that were deemed to be of key importance to WaterNSW. WaterNSW required that the tenderers advise by 13 October 2017 that they accepted the D&C contract, O&M contract and output specification as drafted or, if not, provide detailed departures. All departures were provided by 16 October 2017 and the evaluation committee then revised the evaluation scores. The John Holland Pty Ltd Joint Ventures with MPC Group Pty Ltd t/as John Holland MPC Group Joint Venture for the D&C Contract and Trility Pty Ltd t/as John Holland Trility Joint Venture for the O&M Contract (JHJV) was the preferred contractor based on the scores.

On 23 October 2017, the successful party, JHJV was announced by WaterNSW as the successful tenderer.

4.5 Structure of the successful party and interaction between the O&M and D&C

As noted above in section 4.2.1, the contract tender was designed to ensure that one party was responsible for both the D&C and O&M components to ensure lowest whole of life costs. This is reflected in the structure adopted by the JHJV as the successful tenderer as set out in Figure 3 Corporate Structure below.

Figure 3 Corporate Structure



Each of the individual members of the consortium brings specialised skills to the construction and ongoing operation and maintenance of the pipeline:

- John Holland Pty Ltd has a vast track record in delivering major water and other infrastructure projects in Australia
- MPC Group Pty Ltd is a leading Australian pipeline contractor with expertise in large diameter and remote cross country pipeline construction in the water, gas, energy and mining sectors. MPC Group are involved in the installation of the pipeline
- Trility Pty Ltd is an experienced provider of operations and maintenance services across Australia, with particular experience in asset management and water quality management
- Jacobs is a leading multidisciplinary consultancy with experience in pipeline, pump station, water treatment and quality and high voltage design.

Each of the parties who are members of the JHJV and who are required to perform the D&C and O&M contracts are guaranteed by their parent companies.

5. Design solution

5.1 RFT major pipeline design features and operation and maintenance requirements

The major design features of the pipeline that were included in the RFT were:

- a screened river offtake from the Murray River near Wentworth
- a pump station to deliver raw water from the offtake
- approximately 270 km of supply pipeline from the river offtake to a new bulk water storage near Broken Hill (the pipeline will be underground and constructed substantially of Australian rolled steel)
- a series of supply pump stations and associated infrastructure along the supply pipeline necessary to deliver raw water to Broken Hill including any required storages
- electrical works to run the supply pump stations
- Supervisory Control and Data Acquisition (SCADA), telemetry and Programmable Logic Controller (PLC) systems.

The major features of the operation of the pipeline included in the RFT were:

- ensuring ongoing system availability and meeting return to service periods
- meeting operational demand forecasts provided by Essential Water
- meeting any agreed water quality thresholds at the specified interfaces
- meeting defined safety and environmental performance indicators
- continuous monitoring of system performance efficiency and ongoing corrective action if performance does not meet requirements
- continuous monitoring of system leakage or losses and ongoing corrective action if performance does not meet requirements.

Maintenance of physical infrastructure as set out in the RFT was to include:

- regular maintenance and checks to minimise rates of equipment/component failures particularly unplanned failures that would impact on the ongoing system availability
- scheduled replacement of equipment
- reactive maintenance and replacement within specified return to service periods
- regular checks on all equipment/components to ensure ongoing system availability
- regular auditing of maintenance systems and processes to ensure maintenance activities are being carried out in accordance with an accredited maintenance management system
- recording of maintenance activities and associated costs to enable WaterNSW to demonstrate prudent and efficient maintenance management practises.

5.2 Design solution

5.2.1 Overview

The successful tenderer, the JHJV, proposed a design solution in response to the requirements set out in section 5.1 and described in this section 5.2.

In determining this solution, the supply pipeline diameter and bulk water storage capacity together with the locations of the specified pumping stations were weighed up to obtain the lowest whole of lifecycle cost. The following was considered in detail:

- hydraulic analysis to determine the operating pressure based on each pipe size to ensure that pipe pressure rating was adequate for the static pressure rise and pipeline friction losses at the design flow
- the optimal number of pump stations, resulting in 4, in the locations identified in the RFT (avoiding the cost and time delay associated with further environmental approvals if alternative locations were considered)[4]
- estimating the capital cost of pipelines, pump stations, balancing tanks, bulk water storage and power supply
- the volume/size of the bulk water storage considering the relative impacts of evaporation, algae management, available area and geotechnical issues for each option
- estimating the major operating cost of power – electricity consumption for each configuration
- the availability and timing of the nearest power source
- Net Present Value (NPV) analysis of capital and operating costs to determine the lowest 'Whole of life' cost in today's dollars.

5.2.2 Pipe diameter

Figure 4 Pipes

The RFT, in accordance with the Construction Direction, required a substantial portion of the pipeline to be constructed from Australian rolled steel. The JHJV options analysis determined that significant cost and construction benefits would accrue in using polyethylene (PE) pipe for the first pipeline section between the river intake and the first pumping station (8.75km), given the ground conditions and the construction of the number river crossings.

[4] The RFT proposed an additional pump station which was not required by the JHJV design.

For the 220km section from the first to the third pumping station a number of pipe diameters were considered. A spreadsheet based on the hydraulic model for the preferred configuration was used to confirm that the pipeline operating pressure for the different pipe sizes would not exceed the 3.5MPa (PN35) pipe pressure rating. This was on the basis that the operating pressure would need to be limited to the PN35 rating of readily available pipeline valves, flanges and fittings. Higher rated fittings would be "specials" and could materially impact cost and project delivery timing.

Based on this pressure limit, the number and location of pumping stations were checked. This confirmed that the second pumping station proposed in the RFT could be designed out, resulting in significant cost savings that would be required to construct an additional pump station and the associated power supply infrastructure for this location.

In the desktop optimisation process of the preferred option, the NPV of capital and operating costs for the range of acceptable pipeline diameters and associated pumping stations, bulk water storage and balancing tanks were estimated and compared. Based on this analysis it was found that a 711 diameter[5] pipeline had the lowest lifecycle cost for the 720ML bulk water storage.

However, after contacting the key suppliers it was found that there was less manufacturing capacity for 711 pipe. This diameter pipe could not be manufactured to meet the project timeline. Therefore, a 762 pipeline was selected over a 711 pipeline for a combination of reasons:

- a 711 pipeline could not be constructed within the required timeline using predominantly Australian rolled steel
- a predominately 711 pipeline would require an additional pump station and an extra 26km of electrical transmission line
- the concept design using a predominately 711 pipeline was less robust than the one using 762 diameter pipeline and the risk to needing system changes during the detail design was considerably less than that of a 711 pipeline.

For the 21km section from the third pump station to the Bulk Water Storage a 559 pipeline was selected and included in the JHJV tender. It was thought that the smaller pipeline could be used for this section due to the relatively short distance and manageable height difference (static lift).

However, following contract award and further design work, it was considered that the design could be further optimised by increasing the diameter of this section to 762. Although, this change increased the capital cost by ~1.4M, an NPV analysis over 20 years showed the reduction in power costs more than compensated for the increase, as shown below:

Table 3 Analysis of options - pipe diameter[6]

Where electricity prices increase at CPI ($1.4m Capex)	Evaluation Scenario 1 Base Case (Historical Demand)	Evaluation Scenario 2 Medium Demand	Evaluation Scenario 3 High Demand	Evaluation Scenario 4 Low Demand	Evaluation Scenario 5 High Seasonality
Capital Cost	$1.4M	$1.4M	$1.4M	$1.4M	$1.4M
Annual saving in real dollars	$114.8k	$147.4k	$180.0k	$78.4k	$160.2k
Nominal Savings (over the 20 year period)	$3.1M	$3.9M	$4.8M	$2.1M	$4.3M

[5] All pipeline diameter references are in millimetres.

[6] Source KPMG analysis in Broken Hill Pipeline upsizing pipe diameter variation approval document.

5.2.3 Pump stations

Four pump stations will be constructed, at sites selected by WaterNSW[7]. Using sites with progressed environmental approval processes would minimise time and cost implications of proceeding with alternative sites.

5.2.4 Bulk water storage

A 720ML bulk water storage reservoir will be constructed with two cells. It comprises:

- a 552ML balancing storage to balance peak season inflow and demands and allow for dead storage and evaporation losses
- a 168ML reserve storage to provide emergency volume (3 days of Peak Day Demand, 112.3ML) and volume sufficient to manage supply system outages (1.5 days of Peak Day Demand, 56ML).

This design provides high levels of flexibility for O&M, enabling:

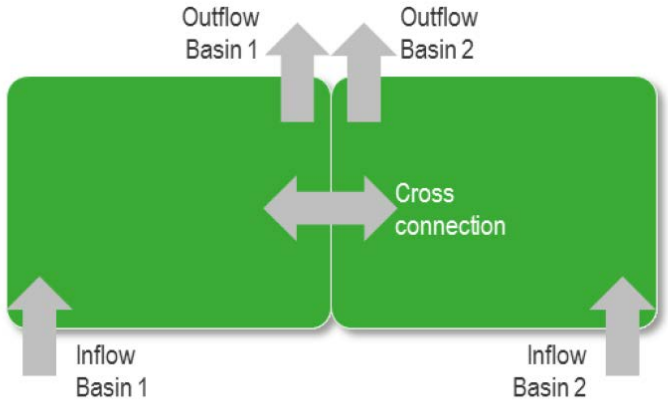
- temporary cessation of extraction of river water should water quality events be identified
- optimisation of power consumption during low demand periods
- consistent asset maintenance.

It ensures that there is a balance of inflows and outflows and the stored volume does not fall below the reserved storage volume at any time other than during emergency operating conditions.

Initially, a 600ML storage was considered but it would have had to have been fully covered. The cost of increasing the size of the storage to account for evaporative losses was considerably more favourable than procuring, installing and maintaining a covered bulk storage system.

The general operation of the storage is shown in Figure 5 Operation of Storage below. Each cell will have an inflow and outflow pipe so that they can be operated independently, as well as cross connections to enable flow between them. The cells will also be isolatable from the main supply pipeline to enable them to be bypassed such that the supply pipeline can discharge directly to the balancing tank at the bulk water storage pumping station. Inflow and outflow points will be located on diagonally opposite sides of each cell to create mixing flows.

Figure 5 Operation of Storage



Generally, the system design has deemed dosing to not to be required. However, for rare events where river water falls outside typical limits for pH, dosing can occur in the balance tank prior to the flowmeter on the bulk water storage outlet, which includes an online monitoring point and sampling cabinet downstream.

5.2.5 Water Quality Approach

The approach to water quality arising from the design provides for:

[7] See section 7.3.3 below in relation to site selection.

- no chemical dosing of any kind
- use of a seal coat on the interior of the pipeline to enhance asset life and prevent any pH impacts from cement lining leaching and calcium carbonate precipitation potential
- use of a passive system to ensure algae management and dissolved oxygen parameters are met during typical operation, and mechanical aeration systems utilised throughout a-typical water quality events to ensure superior whole of life outcomes.

To meet the delivered water quality requirements for dissolved oxygen in the bulk water storage, aeration and mixing will be implemented at the inlet to the bulk water storage. Aeration of inflows and mixing in each storage cell will:

- dissolve sufficient oxygen into the water to overcome dissolved oxygen depletion in the source water and mitigate risks of further depletion with at least 3.5 days detention in the pipeline (the minimum time it will take for water to be conveyed from the Murray River to the bulk water storage)
- prevent potential stagnant areas forming in the bulk water storage and reduce short circuiting
- reduce the risks associated with potential storage stratification in calm weather.

It may also assist in stripping volatile compounds from the water before it enters the storage which provides some additional operational flexibility in managing water quality.

The design includes nine pigging facilities along the pipeline to enable effective and environmentally acceptable removal of biofilm growth and sediments. There is some potential for relatively small volumes of solids to settle in the balancing tanks at each pump station and therefore provision has been made to safely access and clean the tanks.

To mitigate the potential long-term impact of negative Calcium Carbonate Precipitation Potential (CCPP) water on the cement lining of the mild steel cement lined pipeline, and to gain the benefit of improved pipeline durability, a protective seal coating over the cement lining of each pipe will be applied during manufacture. By providing a seal coat the CCPP issue is removed and pH leeching is restricted to less than 1%, removing the need for additional water quality conditioning.

5.2.6 Power

Permanent grid connections are to be constructed close to the town centres of Broken Hill and Wentworth. These locations will reduce the amount of assets to be built and will provide redundancy:

- enabling 24 hour pumping at all of the sites if required by Broken Hill water demand
- allowing for excess energy generated by any future renewable generation source to be exported into the grid providing income[8].

The ownership of the grid connections will transfer to the local electricity provider, in this case Essential Energy, upon completion. The cost of this component is not included in this pricing proposal[9].

In the event of mains power outages, temporary generators will be connected within 1.5 days to resume operations until grid supply is restored, while the bulk water storage power supply will be provided with a permanent back-up diesel generator[10].

[8] A solar power connection was considered but delivered at best a zero NPV or negative NPV for larger installations over 20 years, assuming grid power costs will increase at CPI.

[9] This component is known as Separable Portion 3. Funding for Separable Portion 3 is a matter for Essential Energy and the NSW Government and is not subject to this pricing proposal.

[10] Batteries were considered for grid outages but there was insufficient return on investment for these systems over the design life.

5.3 Volumes

The configuration of the pipeline described above has been designed to ensure it is capable of meeting a number of specified "peak" flows, that is, the maximum flow that the pipeline can sustain over different demand periods, as set out in Table 4 Pipeline demand.

Table 4 Pipeline demand

Demand	Volume	Description/Definition
Peak Season (December – March) Peak Flow	3,708ML for the peak season	The maximum volume that Essential Water will extract from the Broken Hill Delivery Point over the peak season
Peak Day Demand	37.4ML per day	The maximum volume of water that Essential Water will extract from the Broken Hill Delivery Point over any Day
Peak Week Demand	226.4ML per week	The maximum volume of water that Essential Water will extract from the Broken Hill delivery Point over any week
Peak Month Demand	927.4ML per month	The maximum volume of water that Essential Water will extract from the Broken Hill delivery Point over any month
Peak Annual Demand	7,586.6ML per Year	The maximum volume of water that Essential Water will extract from the Broken Hill delivery Point over any year
Minimum Demand	56.0ML per Week (based on an average of 8.0ML per Day)	The minimum volume of water that Essential Water must extract from the Broken Hill Delivery Point over any week (excluding during a shutdown or Force Majeure Event). The minimum demand will be delivered at the minimum flow rate

* Sourced from WaterNSW Murray To Broken Hill Pipeline output specification document table 4.1 (Table of demands) which is attached to the D&C contract

The design flow rate is based on pumping 24hrs/day at the following flow rates:

- 27ML per day (313 L/s) for the supply pipeline system from the river intake to the bulk water storage
- 37.4ML per day (433 L/s) for the supply pipeline system from the bulk water storage to Essential Water's Mica St water treatment plant,

noting that the bulk water storage is used to balance the peak demand and long run delivery rate.

5.4 Offtakes

100 diameter offtakes can be provided to enable connection of farm services to the pipeline. Water will not be supplied to the offtakes when the pipeline is operating at its maximum capacity to meet Essential Water demand requirements, or when the pipeline is required to be shut down for maintenance purposes. This will ensure there are no impacts to the peak flow requirements of 37.4ML per day for Essential Water/Broken Hill.

Each offtake will include a strainer, an actuated open/closed value, a pressure reduction valve limiting pressure to a maximum of 800kPa, a surge relief value (if required), a flow restriction device to limit flow to each offtake to 1ML per day, a flow meter to measure instantaneous and totalised flow, isolation valves to allow access to the flow meter, a pressure reduction valve and actuated valve for maintenance, backflow prevention to prevent water from the offtake entering

the supply pipeline, blank flange at the downstream end of the offtake for customer connection and safe access to the offtakes.

The flow meter and actuated valve will be connected to the control system via telemetry to enable measurements and records of the flow supplied through each offtake, operational control of the actuated valves and sending instrument and control signals to the SCADA system. Controls and instrumentation will be powered via small scale solar connections.

5.5 Control and Operation

Control and operation of the pipeline and bulk water storage will be as follows:

- the pump stations will operate at a set point flow rate input to maintain a target volume in the bulk water storage. The volume in the bulk water storage will be determined by measuring the water level in each cell of the bulk water storage

- the set point flow rate and hours of operation each day will be adjusted by the control system or operators and vary by time of the year and seasonal demand outlooks. This will be done to minimise energy use (kWhr/ML) and to optimise power tariff structure ($/kWhr)

- the number of cells for bulk water storage in operation will be configured in winter to minimise evaporation and mixing/aeration requirements by planning ahead, with the bulk water storage to be filled just before the coming peak season

- inflow to the system will equal the outflow to the bulk water storage and avoid starting and stopping of pumps during an operational period

- in the event of a pump faulting and switching to the standby pump, the interruption in flow rate will be managed by the other pump stations responding by resetting flow set points until the standby pump is up to speed and the original flow set point will be resumed.

5.6 Energy use optimisation

The approach to energy management is to minimise the cost of the pumping regime at all times without compromising the water delivery requirement. As such the system has been configured to minimise the whole of life costs of supplying water to Broken Hill. This has been achieved through the adoption of a lower peak flow delivery capacity in the downstream section to the bulk water storage. The bulk water storage has then been sized to provide adequate storage to meet the critical demand requirement of 30.9ML per day across the 4 month peak season. The downstream section, which comprises only approximately 20km of supply pipeline from the bulk water storage to Broken Hill, has been sized to meet the peak daily design flow of 37.4ML per day.

The expected electricity time-of-use network tariff structure is set out in Table 5 below.

Table 5 Time of Use Tariffs

Period	Start Time	Stop Time	Available Hours	Days
Peak	7 am	9 am	2	Weekdays
Shoulder	9 am	5 pm	8	Weekdays
Peak	5 pm	8 pm	3	Weekdays
Shoulder	8 pm	10 pm	2	Weekdays
Off-Peak	10 pm	Midnight	2	Weekdays
Off-Peak	Midnight	7 am	7	Weekdays
Off-Peak	Midnight Friday	Midnight Sunday	48	Weekends

* Sourced from the table 5 of the Design Report Tender Document No:IA1547000-M-SP 'Control Philosophy Date 17 July 2017. Appendix A.

The system comprises of four pump stations, with each pump set having varying process and energy requirements. The total energy requirement for the whole system is estimated to be in order of 4500 kVa (4050 kW using a power factor of 0.9) for the pump stations.

Essential Water operates the Mica Street water treatment plant during off-peak tariff time such that all town storages are at their maximum level at 7am. The storages reduce during the day due to demand and are refilled again during off-peak hours. With warmer weather, the water treatment plant begins to operate in the peak and shoulder periods and is required to run continuously during heat wave conditions.

The bulk water storage reservoir provides for approximately 19 days requirement for Broken Hill based on peak daily demand. Water distribution post Mica Street storage is a function of consumer demand and will be controlled by Essential Water.

The general control philosophy for the Murray River water extraction and transfer system and bulk water storage transfer will be to maintain capacity of the bulk reservoir and to maximise transfer of water to Mica Street storage during off-peak hours.

The requirement for a least cost operation will be an overarching requirement for the control functionality of the individual pump stations.

6. Services, standards of service and customer consultation

6.1 Customers of the pipeline

The Pipeline Direction specifies for the construction, operation and maintenance of a pipeline from the Murray River to the existing Mica Street Water Treatment Plant in Broken Hill. The Mica Street plant is operated by Essential Water and therefore the primary customer of the pipeline is Essential Water.

However, WaterNSW undertook to determine whether there were other potential customers of the pipeline that could contribute to its costs. For this purpose, WaterNSW engaged a consulting firm, RMCG, to canvass whether access to the pipeline would promote opportunities for commercial activity along the length of the pipeline. This was assessed on the basis of:

- new agricultural or other commercial pursuits that, on a reasonable basis, may provide additional future demand broadly within a price at which the water supply could be offered

- stock and domestic and other similar type water supplies (water as an essential service) that could be provided by the pipeline.

Targeted discussions with stakeholders were conducted in mid-May 2017 to assist in validating the findings and recommendations, with the final report delivered in July 2017.

The report concluded that three issues limit the potential for the pipeline's use by potential customers along the route:

- **Low Population:** The area either side of the 270km highway route, within service range of the new pipeline, has a very sparse population and is dominated by arid climate, range-land grazing. It is likely that a shortage of a reliable, high quality source of water along the Silver City Highway between Wentworth and Broken Hill has been a key factor limiting population. Pooncarie, a village with approximately 40 people, is the only current significant settlement between Wentworth and Broken Hill, and already enjoys access to the regulated Lower Darling River. Pooncarie village is more than 100kms east of the Silver City Highway and proposed pipeline route

- **Existing water service (from the Murray River & the Darling River) to 70% of the new pipeline's potential stock & domestic (rural) customers:** The Darling Anabranch pipeline, constructed in 2006, and managed by Anabranch Water as a NSW Private Irrigation District already provides a good quality raw water supply to a large number of pastoralists in the region. The service provided is well suited to the demands of pastoral businesses, to more than 70 service-points between Wentworth and Broken Hill, a service area almost exactly bisected by the first 150kms (from Wentworth) of new pipeline

- **Limited mine demand outside Broken Hill:** Based on desk top analysis, analysis of published information by the current operators, the two mine-sites nearest the proposed route do not appear to need an additional supply of additional raw water. The current operation of one mine operator (Cristal mines P/L) is already well established, and the other, Capricornia Exploration P/L site (in pre-feasibility stages) has indicated that a supply of raw water will not be required to assist the project's establishment.

Of the opportunities canvassed, only one would potentially provide additional customers wanting to use the pipeline from its commencement: new stock water services for pastoral clients outside the area currently serviced by the Darling Anabranch pipeline who are seeking to secure reliable fresh water (with potential tapping-points along the 70km of the pipeline nearest to Broken Hill). Discussions with the Pastoralists Association of the Western Darling indicated a relatively small number of landholders in the near vicinity of the pipeline (approximately 16 properties). At a meeting held near Coombah NSW there was strong support for a domestic and stock supply for

adjoining and nearby pastoralists to be provided from the pipeline - subject to a much better understanding of the charges likely to apply.

To accommodate this potential immediate demand, the specification in the RFT made provision for installing offtakes along that section of the pipeline, while the O&M contract makes provision for adding additional offtakes to the pipeline during its term should additional demand opportunities emerge over time.

6.2 Raw Water Supply Agreement with Essential Water

WaterNSW has, from March 2017, been negotiating a Raw Water Supply Agreement with our primary customer, Essential Water. The agreement will set out the services and service standards to apply to WaterNSW's provision of pipeline services to Essential Water.

Under the proposed agreement, WaterNSW will be required to use its reasonable endeavours to:

- extract raw water from the Murray River and supply that water to the Broken Hill Delivery Point[11]
- operate and maintain the pipeline to the extent necessary for the provision of the supply of raw water to the Broken Hill Delivery Point.

Essential Water will be required to give to WaterNSW a written weekly order notice setting out the volume of water it will take for each week, which must be below the Maximum Demand and above the Minimum Take (8ML in any 24 hour period) for that week. Maximum Demand is:

- the Peak Daily Day Demand (37.4ML) in any 24 hour period
- the Peak Week Demand (226.4ML) in any 7 day period
- the Peak Month Demand (927.4ML) in any month
- the Peak Season Demand (3.708ML) between 1 December and 31 March in any year
- the Peak Annual Demand (7,586.6ML) in any year[12].

Essential Water will be required to take an amount that is not less than 10% under and not more than 10% over the full amount of the ordered water during the order week.[13]

WaterNSW will have an obligation to monitor turbidity, pH, electrical conductivity, dissolved oxygen, CCPP, temperature and algae at specified test locations and frequencies and make the monitoring available to Essential Water.

6.3 Offtake customers

6.3.1 Engagement with offtake customers

Engagement with potential offtake customers commenced in May 2017 when RMCG met with landholders at Coombah Station as part of their report into determining what additional customers were potentially available to connect to the pipeline.

In July 2017, landholders were contacted by phone to gauge interest in having access to an offtake and the information gathered was fed into the tender process. By this stage, 14 potential offtake customers were identified.

[11] The flanged connection located immediately downstream of the flow meter on the bulk water storage outlet.

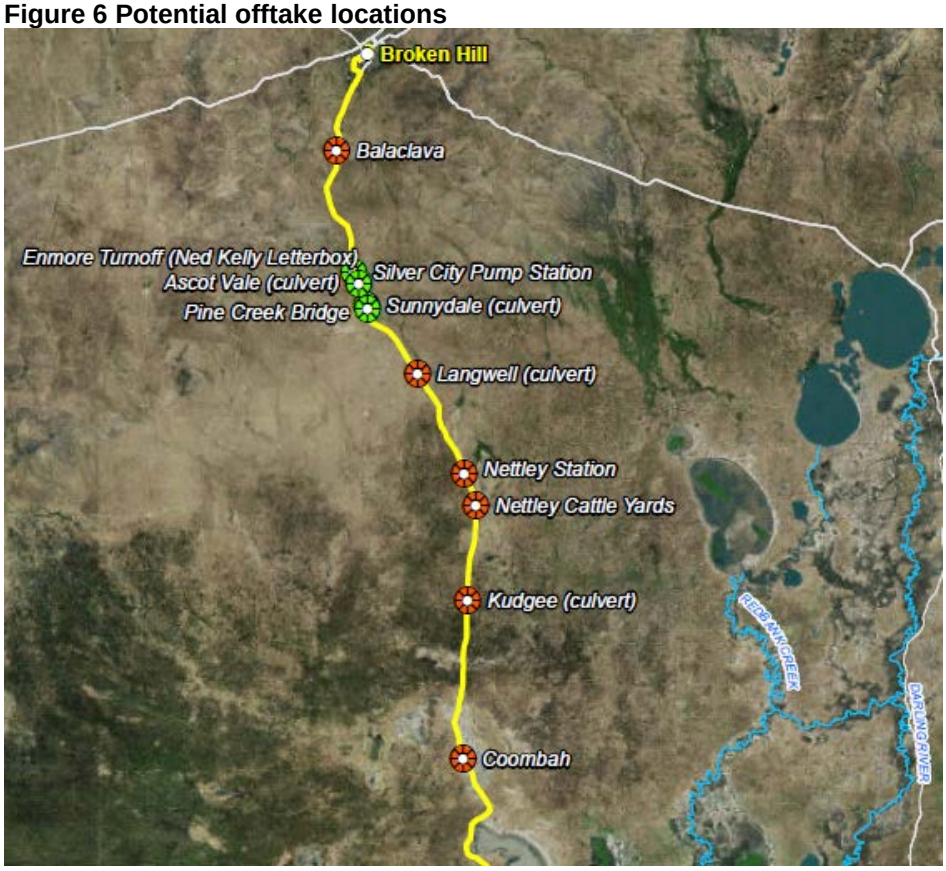
[12] These amounts are the same as the peak flows in the pipeline design. See section 5.3 above.

[13] To the extent that water necessary to satisfy the ordered water is available in the bulk water storage.

In December 2017, a teleconference was held with eight of the potential offtake customers to explain the general approach to determining prices through an IPART pricing determination and to discuss potential locations of the offtakes. Landholders were then surveyed on their potential uses of the pipeline.

Potential locations for the offtakes, as discussed with customers, are shown in Figure 6 Potential offtake locations below.

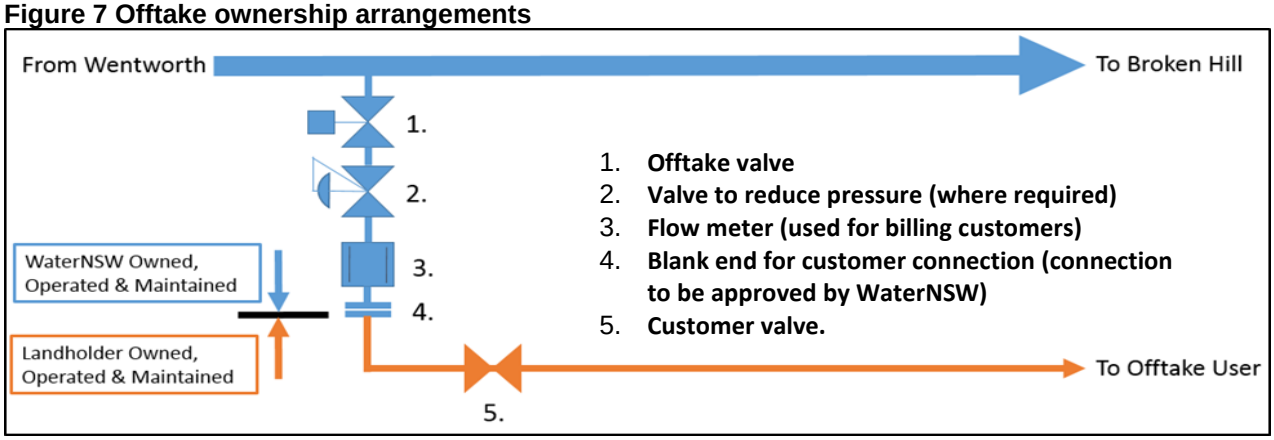
Figure 6 Potential offtake locations



Following WaterNSW analysis of pricing options, in late April 2018, a meeting was held to discuss a range of pricing approaches with eight of the potential customers. WaterNSW presented a Capacity to Pay (CTP) analysis, described further in section 17.5 below. Customer feedback was that the prices presented were too high and beyond customer's CTP.

Ownership arrangements for the pipeline and offtake assets were also discussed with stakeholders, as set out in Figure 7 Offtake ownership arrangements below.

Figure 7 Offtake ownership arrangements



In early May, a survey was provided to all 14 potential customers to determine how many customers would be willing to commit to the offtakes at a maximum price of $14,000 per annum (which included 10ML of water delivery), less than presented in the CTP analysis.

This resulted in four customers confirming interest in the pipeline for three offtakes.[14] One offtake customer will receive access to an offtake close to the bulk water storage as part of the agreement to the purchase land from that offtake customer for the storage.

To accommodate these customers, offtakes will be constructed at three locations.

6.3.2 Letter of Intent with Offtake Customers

WaterNSW and three offtake customers (excluding the customer who will receive access as part of the land acquisition deal) entered into a Letter of Intent with respect of the construction of the offtakes at two locations.[15] The main features of the Letter of Intent include:

- the letter will only bind the offtake customers if IPART determines a price of less than $14,000 (per offtake outlet) in real terms per annum inclusive of 10ML per annum of water delivery for the 2019 to 2023 period
- the parties will enter into a formal water supply agreement to enable provision of water after commissioning
- use of the pipeline will be prioritised to service the Broken Hill township.

[14] Two customers confirmed interest in the same location.

[15] Ibid

7. Legislative and Regulatory Framework

7.1 Overview

This section sets out the primary legislative and regulatory framework for the construction and ongoing operation of the pipeline and the services to be delivered by the pipeline.

7.2 Construction notifications

To enable construction of the pipeline, the notifications set out in Table 6 Notifications below were required. These were provided to the relevant authorities.

Table 6 Notifications

Reference	Requirements	Agency
S199 of Fisheries management Act	Notification for Dredging and Reclamation Works	DPI Fisheries
Clause 16 State Environmental Planning Policy (Infrastructure) 2007	Notification of development comprising a fixed or floating structure in or over navigable waters	RMS
Clause 13 State Environmental Planning Policy (Infrastructure) 2007	Notification for Impacts on Council related Infrastructure or Services	Broken Hill City & Wentworth Shire Councils
Clause 14 State Environmental Planning Policy (Infrastructure) 2007	Notification on developments with impacts on local heritage	Broken Hill City & Wentworth Shire Councils
Clause 15 State Environmental Planning Policy (Infrastructure) 2007	Notification of development with impacts on flood liable land	Broken Hill City & Wentworth Shire Councils
Clause 45 of the Electricity Supply Act 1995	Notification of electricity works	Broken Hill City & Wentworth Shire Councils

7.3 Environmental Approvals

7.3.1 Review of Environmental Factors

WaterNSW is a public authority and is the determining authority as defined in the *Environmental Planning and Assessment Act 1979 (NSW)* (EP&A Act). The pipeline project satisfies the definition of an activity under the EP&A Act, and as such WaterNSW was required to assess and consider the environmental impacts of the pipeline project before proceeding to construction.

A review of *State Environmental Planning Policy (State and Regional Development) 2011 (NSW)* concluded that the pipeline project did not trigger the State significant infrastructure provisions and therefore did not require development consent. As development consent was not required, the project had to be assessed under Part 5 of the EP&A Act. WaterNSW engaged Public Works Advisory NSW Water Solutions (PWA) to assess, to the fullest extent possible, all matters likely to impact on the environment arising from the project.

7.3.2 Pipeline REF

Figure 8 Pipe strung at the southern end of the pipeline route

PWA prepared a Review of Environmental Factors Report (REF) in accordance with sections 111 and 112 of the EP&A Act and clause 228 of the *Environmental Planning and Assessment Regulation 2000* and concluded that:

- the project is not likely to have a significant impact on the environment and therefore an Environmental Impact Statement is not required
- the project is not likely to significantly affect threatened species, populations, ecological communities, or critical habitat. Therefore, a Species Impact Statement was not required
- the project is not likely to affect any Commonwealth land, is not being carried out on Commonwealth land, or significantly affect any Matters of National Environmental Significance

subject to implementation of measures to avoid, minimise or manage environmental impacts listed in the REF.

In preparing the REF, PWA engaged a number of sub-consultants and consulted with key stakeholder and regulatory agencies. Led by PWA, a number of extensive onsite surveys and workshops were held to assist in developing:

- Flora and Fauna Assessments
- Aboriginal Cultural Heritage Access Assessments
- Traffic & Transport Assessments

- Noise Impact Assessments
- Historical Heritage Assessments
- Social Impact Assessments
- Wind Rose Data
- Land Tenure Details
- Geology Maps
- Archaeological Sensitivity Maps.

7.3.3 Pump site and construction REF

Site selection was a process commenced by NSW Public Works, prior to WaterNSW having responsibility for delivery of the project. NSW Public Works selected four initial sites along the route. Then in July 2017, during the tender process, the tenderers were asked to nominate their preferred locations for pump stations. These were then rationalised by WaterNSW, taking into account comments from Wentworth and Broken Hill Councils and to ensure ongoing competitive innovation from the tenderers. Noting the REF requirements, this resulted in one additional location being added to the original four.

Surveys of these five locations commenced on 29 August 2017 and Review Environmental Factors under the Environmental Planning and Assessment Act 1979 (NSW) was determined on 25 October 2017. The JHJV required four of the five sites and the final approvals for those four sites were received in December 2017.

The JHJV requested additional sites along the pipeline route for construction purposes requiring addenda to the REF. These addenda were approved by the date of the pricing proposal.

7.3.4 Compliance

In the tender process, each of the proponents were required to develop a Construction Environmental Management Plan (CEMP) based upon the mitigation measures developed under the draft REF and regulators' approvals. The CEMP forms part of the D&C contract. This was then confirmed once the final REF was approved.

At a practical level on site, WaterNSW's site environmental representative and other site personnel make routine inspections and highlight issues of concern to the contractor in relation to the mitigation measures in the REF and CEMP. Where necessary these items are then raised with senior management to be dealt with contractually.

WaterNSW developed an actions and issues register and completed the first (southern) half of an audit inspection on 8 March 2018 to highlight any potential non-conformances and opportunities for improvement. The second, northern, half of the audit was completed on 22 and 23 May 2018.

Figure 9 Water truck

7.4 Aboriginal Cultural Heritage

7.4.1 Overview

The EP&A Act establishes the framework for cultural heritage values to be formally assessed and requires that environmental impacts, including those relating to heritage items are considered prior to land development.

Part 6 of the *National Parks & Wildlife Act 1974 (NSW)* (NPW Act) provides specific protection for Aboriginal objects and declared Aboriginal places by establishing offences of harm. It was determined that the project is not a low impact activity, as defined by the NPW Regulations, as there was a high risk that it would, directly or indirectly, harm an Aboriginal object, or a declared Aboriginal place. Therefore, under the NPW Act, it was necessary to apply to the Office of Environment and Heritage (OEH) for an Aboriginal Heritage Impact Permit (AHIP).

The AHIP is a legal document that grants WaterNSW permission to harm Aboriginal objects or declared Aboriginal places, and sets out any conditions that WaterNSW must comply with. Each AHIP is required to be undertaken in accordance with several regulations and guidelines:

- Aboriginal cultural heritage consultation requirements for proponents 2010 (ACHCRs) (NSW Department of Environment, Climate Change and Water (DECCW), 2010a)
- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010b)
- Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW, 2010c)

- Guide to Investigating, assessing and reporting on Aboriginal cultural heritage in NSW (NSW Office of Environment and Heritage (OEH), 2011)
- Applying for an Aboriginal Heritage Impact Permit: Guide for applicants (OEH 2011)
- The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS, 2013).

OEH requires each AHIP to include:

- a summary of Aboriginal consultation undertaken (this was an intensive process that took approximately 8 months to complete)
- a background literature review of relevant past archaeological assessments and heritage registers
- a review of the environmental context
- an archaeological predictive model & sampling strategy
- an aboriginal heritage survey (surface sampling strategy)
- if required, subsurface test excavation (subsurface sampling strategy
- an assessment of the significance of any identified Aboriginal objects, places or cultural values
- an assessment of any potential impacts to the Aboriginal objects, places or cultural values
- recommendations for management and mitigation measures.

7.4.2 AHIP Application Process

WaterNSW was required to undertake an Aboriginal Cultural Heritage Assessment (ACHA) to inform the Review of Environmental Factors and the requirements for the AHIPs.

To facilitate a timely start to construction works, the AHIP applications to manage and mitigate harm to Aboriginal objects for construction of the pipeline were submitted in four stages. The table below describes each stage and the date of approval of each AHIP application.

Table 7 AHIP application by stage

Stage	Description	Date Approved by OEH
1	Broken Hill to Pine Creek	4/12/17
2A	Wentworth to Anabranch	22/12/17
2B	Anabranch to Coombah	12/02/18
2C	Coombah to Pine Creek	22/3/18

To comply with the obligations under Part 6 of the NPW Act, it was necessary for each AHIP application, for WaterNSW to:

- prepare a draft a Cultural Heritage Assessment Report (CHAR)
- provide the draft CHAR to Registered Aboriginal Parties (RAP) for a 28 day review
- provide the draft CHAR to OEH
- following feedback from RAP and OEH, finalise the CHAR and AHIP application and submit to OEH
- await assessment of the AHIP by OEH.

In preparing the AHIPs, WaterNSW undertook several layers of detailed analysis and proposed a range of mitigation strategies which were accepted by OEH in order to minimise harm.

7.4.3 Mitigation Strategies & AHIP Conditions

The AHIPs granted by OEH under section 90 of the NPW Act contain a number of conditions which WaterNSW must comply with relating to:

- conditions 6-8 concerning Aboriginal objects which must not be harmed
- conditions 9-10 regarding movement of Aboriginal objects
- conditions 11-16 relating to test/salvage excavations and dating
- conditions 19-23 – storage and relocation of salvaged Aboriginal objects
- conditions 25-36 notification and reporting obligations.

In summary, the AHIPs conditions require WaterNSW to:

- salvage a representative sample of Aboriginal objects from sites of moderate or higher significance
- collect dating samples from viable hearths
- collect a representative sample of dates from Aboriginal sites within the moderate to very high archaeological sensitivity areas
- reduce knowledge gaps and improve regional understanding of the subsurface archaeological resource by undertaking subsurface archaeological salvage in a representative sample of sites of moderate significance in moderate to very high subsurface archaeological sensitive landforms and landscapes
- include a protocol for the management of unexpected finds, including but not limited to stone artefact sites, hearths, culturally modified trees, shell, burials
- include a protocol for the discovery and management of human remains, including stop work provisions and notification protocols
- include a protocol for managing gender-specific cultural values
- include an adaptive management framework to manage the discovery of any Aboriginal sites and values of high regional significance (such as Pleistocene aged sites).

To comply with the AHIP conditions, WaterNSW has pursued general management strategies with regard to both direct impacts (e.g. surface disturbance) and indirect impacts to Aboriginal sites (e.g. increased erosion, unintentional increase in traffic). Avoidance of known sites/high risk areas during pipeline development is ongoing through the detailed design phase.

Mitigation strategies for unavoidable impacts include:

- salvage excavation and landscape characterisation of a sample of areas within the moderate to very high subsurface archaeological sensitivity
- sub-surface salvage
- salvage surface collection in surface high risk layers
- unmitigated harm in low and low-moderate risk layers.

Given the compressed timeframe and potential need to work at night, WaterNSW elected to undertake a salvage program instead of ongoing monitoring which would have been unsafe in front of machinery.

7.5 Water Access Licensing

Under the D&C contract, the contractor is responsible for obtaining the water required for the construction and commissioning of the pipeline. This can occur either by obtaining their own Water Access Licence (WAL) and water entitlement or obtaining a zero WAL and purchasing a temporary water allocation from the trade market.

WaterNSW will not obtain a WAL for continued pipeline operations. WaterNSW will enter into agreements with Essential Water and customers of the offtakes for the transportation of their water from the Murray River through the pipeline. These agreements will prioritise Essential Water's requirements above the offtake customers to secure the drinking water requirements of Broken Hill, see section 6.3.2 above.

Essential Water currently have a WAL for water from the Darling River and a works approval to extract that water from the Darling River. Essential Water are working with Department of Industry - Water to terminate their current Darling River WAL and to obtain a Local Water Utility WAL for the Murray River.

Each offtake customer will be required to obtain their own WAL for water from the Murray River.

7.6 Water Supply Work Approval

WaterNSW has applied to the Department of Industry – Water for a Water Supply Works Approval under the WM Act to extract water from the Murray River. Each customer's WAL will be linked to WaterNSW's Water Supply Works Approval for the pipeline.

7.7 Land Access

The area traversed by the pipeline comprises land with the following tenure:

- private/freehold land - including land owned by Councils and other Statutory Corporations
- Western Lands Division (WLD) land - perpetual leasehold land
- Crown land - including unmade roads, water crossings and reserves
- public land - including land vested in Councils or public authorities, such as road authorities and road reserves

- Native title
- Aboriginal land (granted under NSW Aboriginal land rights legislation).

7.7.1 Land Access and Acquisition Process

The process of dealing with land access, lease and interest acquisition involves four key stages:

- Pre-construction surveys and investigations (consent/notice to enter land)
- Construction - construction leases including property management plans, either negotiated (preferred) or obtained through compulsory process
- Easement/permanent interest acquisition - acquisition agreements or compulsory acquisition and lodgment forms
- Creation of land interests in the SPV.

WaterNSW engaged a third party property agent to co-ordinate and manage the land access and acquisition process with private /freehold land holders and WLD.

7.7.2 Cadastre Issues

During the pre-construction surveys and investigations, it was noted that the existing cadastre along the sections of the Silver City Highway road reserve were not accurate. At some locations (due to errors in historic cadastral boundary creation) the road reserve is not aligned with the cadastre boundaries.

WaterNSW engaged a third party to rectify the cadastre issues as accurate cadastre information are required for the creation and registration of easements and to inform with confidence the ownership and land lease areas required by WaterNSW.

7.7.3 Construction Leases

Construction lease payments have been structured as follows[16]:

- Offer to Lease Payment: an incentive payment to the lessor of a set fee payable within 30 days after WaterNSW has signed the lease; and
- Rental payment: allocation of a rental amount per km over the entire length of the pipeline.

The construction leases contain the following:

- Property Management Plan: set outs property-specific items such as preferred access ways, existing buildings and equipment on the land, and proposed mitigation measures to be carried out by WaterNSW to minimise the impact that the construction works will have on the land, including the leased area
- Remediation: the leases require WaterNSW to remediate the leased area before the expiry of the 2 year lease term. Where WaterNSW is not able to complete its remediation activities in that time frame, WaterNSW may call for a remediation lease of a further 2 year period.

[16] WaterNSW engaged two independent valuers to assist with valuations when entering into construction leases and negotiations for leases for permanent land assets such as the pump station and bulk water storage sites with landowners. Following completion of construction, these valuers will prepare the valuations for the pipeline easements.

7.7.4 Permanent Tenure

WaterNSW has statutory rights under the WaterNSW Act to access the pipeline for maintenance (amongst other things), once it has been constructed. However, WaterNSW intends to either acquire easements for the pipeline or purchase the land, so that its rights are registered on title. WaterNSW can compulsorily acquire easements or the land for the pipeline under the WaterNSW Act, but would prefer to enter into agreements for the purchase or the grant of easements. These agreements (appending the associated valuations) will be negotiated with landholders after the pipeline has been constructed.

In the event WaterNSW is required to acquire the land or an easement compulsorily, WaterNSW will pay any necessary compensation to the landowner in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).

7.7.5 Public/Crown land

Licences were obtained on behalf of WaterNSW for both the investigation works and the construction works from Department of Industry - Crown Lands under section 34A Crown Lands Act 1989 (NSW) in relation to Public/Crown Land.

A permanent licence to access the pipeline for maintenance (amongst other things) once it has been constructed will be required from the Department of Industry - Crown Lands.

7.7.6 Native Title

The Commonwealth Native Title Act 1993 (NT Act) sets up processes to determine where native title exists, how future activities impacting upon native title may be undertaken, and to provide compensation where native title is impaired or extinguished. The NT Act gives Indigenous Australians who hold native title rights and interests or who have made a native title claim, the right to be consulted and, in some cases, to participate in decisions about activities proposed to be undertaken on the land.

The area between Wentworth and Broken Hill is subject to a determined native title claim which recognises the Barkandji people as the traditional owners of land. Native title has been extinguished over most of the project land, however native title rights apply to certain land at and around Broken Hill, east of Wentworth, most of the Murray River and its shore, and to some land between Menindee and Wentworth.

Irrespective of whether native title rights and interests have been recognised as 'exclusive' or 'non-exclusive', the Barkandji native title holders have rights and interests that need to be addressed and managed using appropriate 'future act' processes under the Act.

As the land is Public/Crown Land, the Department of Industry – Crown Lands has issued to the Barkandji people a Notice under section 24KA of the NT Act. Section 24KA of the NT Act applies to the construction, operation, use, maintenance and repair of water pipelines (and transmission lines) that are operated for the general public.

Section 24KA of the Act does not apply to the establishment of large above ground infrastructure such as pumping stations. However, all project lands affected by native title will not have large above ground infrastructure established on them.

The “non-extinguishment principle” applies to any acts done in reliance on section 24KA. This means that the activities conducted in accordance with section 24KA will not extinguish any native title rights that exist in the affected area.

The Barkandji People will be entitled to compensation for the effect that the pipeline construction activities has on their native title rights and interests. Calculating what, if any, compensation will need to be paid will take into account the fact that the ‘non-extinguishment principle’ applies to acts under section 24KA of the Act.

7.7.7 Aboriginal Land Rights Land

Two parcels of land near Wentworth are subject to an undetermined Aboriginal Land Rights Claim by the Dareton people. WaterNSW has obtained agreement from the Dareton Land Council to access the land for the purposes of constructing, operating, maintaining and repairing the pipeline.

7.8 Direction Requirements

7.8.1 Introduction

As set out in section 3.1 above, the Minister issued two directions to WaterNSW under section 20P of the SOC Act, the Pipeline Direction and the Construction Direction. The project to construct and then operate and maintain the pipeline as described in this pricing proposal is to ensure compliance with the Pipeline Direction.

Section 7.8.2 below provides further detail on compliance with the timing aspect of the Pipeline Direction while section 7.8.3 and section 7.8.4 below provide further details on compliance with the Construction Direction.

7.8.2 Timing

The Pipeline Direction directs the Board of WaterNSW to use best endeavours to make the pipeline operational by December 2018, and notwithstanding this, ensure that the pipeline is fully operational before all surface water and the Lake Menindee groundwater source available to the Broken Hill community are depleted.

Meeting this timeframe underpinned many aspects of WaterNSW's approach to the design of the RFT, the contractual negotiations and the JHJV's tender response and design. In particular:

- the D&C contract includes the milestone of "Ready for Water". It is defined as the point at which the pipeline is able to be operated safely to deliver 8 ML of water per 24 hour period[17]. The contractual target date for Ready For Water is December 2018 (prior to the commissioning date of April 2019). The supply of water after the Ready for Water milestone has been reached but before practical completion of the pipeline are called the Early Water Services. Early Water Services will be called in the event there is no alternative water source for supply to the Broken Hill township.

- in order to maximise the possibility of achieving the Ready for Water target date:

    - during the RFT phase of the project, WaterNSW ordered 50km of pipe from Steel Mains Pty Ltd with mechanical parameters that could be used by all four tenderers

[17] ***Ready for Water*** is achieved when, as a minimum, each of the following is completed and verified to the satisfaction of the Independent Verifier with respect to both the pipeline and assets to be transferred to Essential Water:

(a) the works are able to be operated safely:

manually; and

using temporary power and communications;

(b) all hydrotesting of the works has been completed and passed;

(c) the elements of the works comprising bulk storage, surge and tanks have been hydrotested and passed;

(d) the contractor has demonstrated to WaterNSW's satisfaction that 8mL water in 24 hours can be pumped and delivered to the Broken Hill Delivery Point safely and in accordance with applicable legislative requirements and approvals; and

(e) the contractor has met all other requirements for the achievement of Ready for Water as set out in the D&C specification documents or WaterNSW's project requirements.

(e.g. 762 diameter, 6mm thick grade, 300MPa strength grade steel). This order was then novated to the JHJV upon contract award

- WaterNSW divided the length of the pipeline into four sections in order to obtain AHIPs. This enabled construction to proceed concurrent to obtaining AHIPs for the most difficult sections (see section 7.4 above)

- under the D&C contract the Independent Verifier (IV) needs to determine whether the contractor can achieve the Ready for Water Sunset Date - which is the date that is 180 days after the date for Ready for Water. This can be done anytime from six months after contract award. If the IV determines the contractor is not able to achieve the Ready for Water Sunset Date then they can instruct the contractor to accelerate at its own cost. WaterNSW has planned two rigorous “look forward” tests to ascertain confidence levels to achieve the required date and these tests are scheduled for April and June 2018. The results of these tests will be forwarded to the IV for information as well as used by WaterNSW to determine any other rectification action.

7.8.3 Australian Steel

The Construction Direction directs the Board of WaterNSW to ensure that Australian rolled steel is substantially used in the construction of the pipeline, regardless of where the pipe in manufactured.

WaterNSW incorporated this requirement into the RFT as a major design feature, see sections 5.1 and 5.2 above. The design adopted by the JHJV satisfies this requirement by using:

- polyethylene pipe for the first 8.75km between the river intake and first pumping station (to accommodate the river crossing and ground conditions)

- Australian rolled steel for the balance of the 270km pipeline.

The Australian rolled steel has been manufactured by Blue Scope Steel in Port Kembla, totaling approximately 28,000 tonnes of hot rolled core. The steel has then been manufactured into pipe by Steelmains from two manufacturing plants – one in Perth and one in Melbourne. The pipe is then transported in economical load sizes from the factories as it is completed:

- pipe manufactured in Perth is transported by rail to Broken Hill and then by truck to a pipe laydown area or directly to the to where the pipe will be laid (the Right of Way)

- pipe manufactured in Melbourne is transported by truck to a pipe laydown area or directly to the Right of Way.

Figure 10 Picture of pipe during stringing process

7.8.4 Job requirements

The Construction Direction directs the Board of WaterNSW to ensure that the minimum targets set in the NSW Infrastructure Skills Legacy Program are met for the construction of the pipeline, in consultation with the Department of Industry to the extent possible given the remote location of the project and with relevant targets negotiated through the tender process.

The D&C contract requires the minimum targets to be met[18].

The minimum targets as agreed with the Department of Industry are as follows:

- total Full Time Equivalent (FTE) of "learning workers" (defined as trainees and workers who need to update their qualifications to meet the needs of the infrastructure project) for the project equivalent to 20 per cent of the total labour force until the project is 90 per cent complete

- apprentices comprising 20 per cent of all trades positions, being the equivalent of one apprentice to every four tradespeople

- double the number of women in non-traditional pathways in the general construction and civil construction sectors, so women are employed in at least 2 per cent of trade-related work and with a clearly defined strategy to increase the number of women employed in those roles throughout the life of the infrastructure project

[18] Sections 11.3.3 and 11.3.20 of Appendix B of Schedule 4 (*Output Specification*) of the D&C contract requires the Australian Industry Participation Plan and the Training and Apprenticeship Plan (both D&C Management Plans under the Contract) to address how the contractor shall meet its targets to align with the Infrastructure Skills Legacy Program. Clause 34 of the D&C Contract requires the contractor to ensure Approved D&C Management Plans are implemented and complied with.

- annual growth in Aboriginal and Torres Strait Islander people in both trade positions and non-trade positions in general construction and civil construction consistent with the NSW Government's Aboriginal Participation in Construction Policy

- 8 per cent of the total project workforce aged less than 25 years

- strategies to ensure projects employ and train people from the local region.

JHJV report on their progress in meeting the minimum targets to the Department of Industry on a monthly basis. The April 2018 report showed the JHJV had met the learning workers, women in not traditional pathways, Aboriginal and Torres Strait Islander, workforce aged less than 25 years and people employed from the local region targets.

8. Proposed Determination Period

8.1 Four year period

WaterNSW is proposing a determination period of four years (subject to adjustment as set out below). The reasons for this include:

- four years is the standard pricing period for IPART regulated water utilities (other than the Sydney Desalination Plant)
- Essential Water's past determination periods have been for four years and we understand from Essential Water that they will be seeking a four year determination period to commence from 1 July 2019
- aligning the determination for the pipeline with Essential Water's determination will enable Essential Water's prices to accurately incorporate the cost of the pipeline. Deviations between the timing of the pipeline determination and Essential Water's determination may need additional mechanisms for Essential Water to manage the discrepancies between determinations
- a major input to operating expenditure is electricity. Our approach to managing uncertainty associated with electricity prices over the proposed four year term is set out in section 16.4 and section 17.9 to 17.13. A period longer than four years is undesirable. The infrastructure is new and so the operational rhythm and demand for its services is untested and at this stage it is not possible to determine operational efficiencies of the infrastructure until it is in situ and operational for a number of years. This makes forward looking decisions early on in its operation undesirable
- WaterNSW is unusual among regulated water utilities in currently having 4 separate pricing determinations. As such it needs to balance the timing between its different determinations to enable the business to appropriately plan and resource for each determination. Currently, a four year cycle for the pipeline should not pose a timing issue vis a vis the other determinations.

Therefore, this pricing submission only includes four years of future operating and capital cost and pipeline charges.

8.2 Timing issues

The expected commissioning date of the pipeline and commencement of the provision of services to Essential Water is late April 2019. At the time of preparing this submission, we are confident that this date will be met. Although the project team is carefully managing to achieve this timeframe, for a project of this scale, it is not unusual for circumstances to develop which may change this timeframe. We will update our projected commencement date throughout the IPART review timeframe.

However, as IPART currently anticipates releasing its final pricing determination in May 2019, there are a few scenarios which may transpire and we have made provision for these through our agreement with EW:

- the pipeline commences operation before or after IPART publishes its final pricing determination in May 2019 but prior to 30 June 2019 (including any Early Water Services). In these circumstances, we would seek to apply the nominal prices in the final determination for the part period to 30 June 2019 (with prices for 2019/2020 subject to inflation) and request that the final determination makes provision for this (if this is scenario is considered likely

closer to the relevant time)[19]

- the pipeline commences operation subsequent to 1 July 2019. In these circumstances we would seek to apply the prices in the final determination for 2019/2020 from the date of commencement of operation.

Figure 11 Machine laying pipe

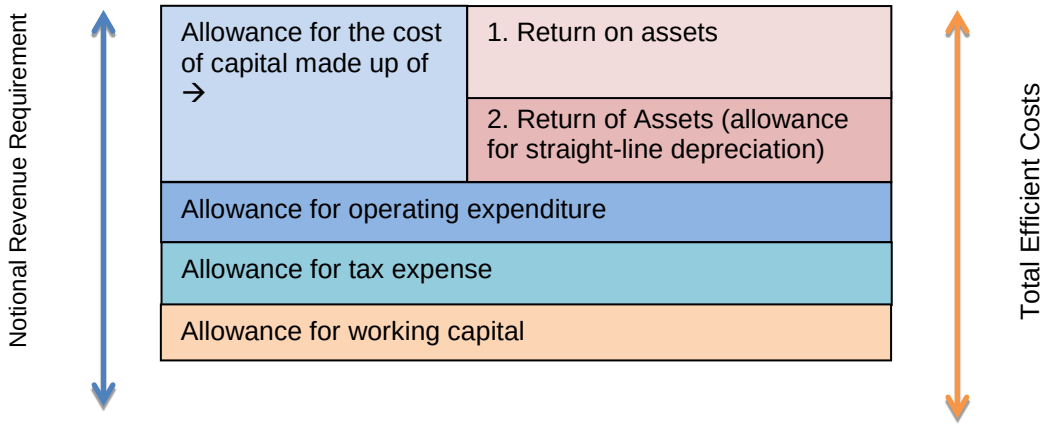
[19] In these circumstances billing arrangements may be based on prices in this pricing proposal or IPART's draft determination with subsequent reconciliation to the Final Determination.

9. Notional Revenue Requirement

9.1 Building blocks approach

IPART usually sets prices to reflect the prudent and efficient costs of providing monopoly services to customers using a 'building blocks' approach. The 'building blocks' form the regulated entity's cost base for pricing purposes. The sum of the building blocks is called the notional revenue requirement, which is used by IPART to construct prices. The building blocks are shown below.

Figure 12 Building Blocks



WaterNSW has calculated its notional revenue requirement using the:

- Regulatory Asset Base (RAB) building blocks approach for the pipeline assets;
- annuities approach for the offtake assets.

Sections 10 to 17 of this pricing proposal work through each element of the notional revenue requirement, as shown in Table 8 Building Blocks and the customer charges.

Table 8 Building Blocks

Building Block	Description	Section of the Pricing Proposal
Return on Assets	Return on assets which is calculated by multiplying the value of the assets (the 'Regulated Asset Base' or RAB) by the Weighted Average Return on Capital (WACC)	The RAB is discussed in section 10, including the capital expenditure assumptions. This section also discusses the annuities approach used to compute the capital cost for the offtake assets. The WACC is discussed in section 12
Return of Assets	Return of assets, also known as the regulatory depreciation allowance, is calculated by dividing the value of the RAB by the useful life of the assets	Depreciation and asset lives are discussed in section 11
Operating Expenditure	The operating expenditure allowance consists of a bottom up forecast of the operating expenditure needs of the pipeline including the costs associated with the management and good governance of the SPV	Operating expenditure is discussed in section 16.

Tax Allowance	The regulatory tax allowance is an estimate of the SPV's tax liability calculated in accordance with IPART's decision on the Incorporation of Company Tax in Pricing Decisions	The tax allowance is discussed in section 13
Working Capital allowance	The working capital allowance, is a nominal amount which compensates the SPV for the liability that arises due to the timing differences between accounts payable and accounts receivable	The working capital allowance is discussed in section 14
Customer Charges	Individual charges to recover the notional revenue requirement, including specific charges for Essential Water and the offtake outlet customers.	The charges are discussed in section 17

9.2 Notional revenue requirement

WaterNSW's proposal on the notional revenue requirement is summarised below. The revenue requirement is illustrative and assumes:

- an average demand of 5,746 MLs per annum from the pipeline
- actual retail electricity rates[20] for the regulatory year 2019-20 and 2020-21
- benchmark electricity tariffs which were sourced from the ACIL report discussed further in section 16.4, applied for:
    - **2019-20 and 2020-21:** benchmark network tariffs and other electricity tariffs (i.e ancillary charges), along with actual retail electricity rates, as specified above;
    - **2021-22 and 2022-23:** benchmark electricity tariffs (i.e retail, network, and other charges).
- Forecast distribution and margin loss factors were applied to all retail electricity rates (actual and forecast across the 2019-23 period, which were sourced from the ACIL report).

[20] We understand retail electricity rates generally incorporate wholesale cost and retail margin (excluding network charge and other ancillary charges).

Table 9 Notional Revenue Requirement

Notional Revenue Requirement (2018-2019 $)						
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**Total**	**Average**
Operating and maintenance*	5,229.0	5,101.1	4,806.5	5,006.5	20,143.1	5,035.8
Return of capital (depreciation)	5,600.4	5,600.4	5,600.4	5,600.7	22,401.8	5,600.4
Return on capital	19,275.8	19,045.5	18,804.7	18,565.0	75,690.9	18,922.7
Working Capital Allowance	136.4	143.1	141.5	140.6	561.6	140.4
Tax allowance	1,087.1	1,115.8	1,140.8	1,165.0	4,508.7	1,127.2
Annuity for offtakes**	14.6	14.6	14.6	14.6	58.5	14.6
Total costs	**31,343.2**	**31,020.5**	**30,508.4**	**30,492.4**	**123,364.5**	**30,841.1**
> Balance of RAB used to calculate return on capital	457,559.8	452,340.3	446,620.8	440,901.3	n.a	n.a

* This includes average electricity payments of $2,53M per annum, based on average demand of 5,746ML per annum and using 1) actual retail electricity rates to FY21 (incorporating a forecast loss factor from ACIL Allen) 2) benchmark network rates and other incidental and ancillary electricity tariffs, sourced from ACIL Allen and applied for the period 2019-23 period and 3) benchmark (forecast) retail electricity rates from 2021-22 to 2022-23, sourced from ACIL Allen.
** refers to the forecast of annuity payments for offtake assets. The annuity is used to compute the fixed charge to recover the capital cost associated with each offtake outlet . The annuity has been applied to two offtake outlets. Pricing for offtake assets is discussed further in sections 10.4 and 17.5 of this pricing proposal.

9.3 Cost reflective charges

The notional revenue requirement will be recovered from customers using a cost reflective charging structure, comprising separate water delivery charges for Essential Water and for each offtake outlet, as set out in Table 10 Charges below.

Table 10 Charges

Charge	Customer	Charge Type
Pipeline Charge	Essential Water	Fixed Charge, levied irrespective of water take
Fixed operational and maintenance charge	Essential Water	Fixed Charge, levied irrespective of water take The fixed operational and maintenance charge is not levied while the pipeline is in shutdown/standby mode
Electricity demand charge	Essential Water	A single rate on water usage which applies at all times when the pipeline is activated in order to facilitate a water order for Essential Water
Fixed electricity charge	Essential Water	Fixed Charge, levied irrespective of water take
Offtake Charge	Offtake outlet, (levied on a per offtake basis)	Fixed Charge, levied irrespective of water take
Variable Charge	Essential Water/Offtake customers (levied on a per offtake basis)	Variable Charge, levied on each per ML of water taken at the relevant metering supply point
Shutdown, restart and standby charges	Essential Water	Fixed Charge, levied irrespective of water take. Shutdown charge is levied per shutdown event. Restart charge is levied per restart event. Standby charges are levied for each day the pipeline is in Standby, the period between Shutdown and Restart.
Early Water Variable Charge	Essential Water	Variable Charge, levied on each per ML of water taken at the relevant metering supply point during the provision of Early Water Services, or water supply after the 'Ready for Water' date (i.e water which is delivered before the asset is commissioned).

Most of the revenue will be recovered via fixed charges, with a small proportion of revenue recovered via variable charges reflecting the variable cost of electricity, consistent with the principles of cost reflective pricing. A cost reflective charging structure promotes the economically efficient use of the pipeline while minimising financial risk to WaterNSW.

The fixed to variable split is approximately 92% to 8%, assuming 5,746MLs of average demand per annum. The fixed/variable split is illustrated in Table 11 and Table 12 below by customer group and charge category.

Table 11 Variable Revenue by Charge Category

Variable Revenue (18-19$)						
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**Total**	**Average**
Variable charge – offtake customers	$9.64	$8.96	$7.54	$8.38	$34.53	$8.63
Variable charge - EW	$1,847.13	$1,729.24	$1,474.04	$1,656.81	$6,707.22	$1,676.80
Electricity demand charge - EW	$820.80	$820.78	$820.79	$820.83	$3,283.20	$820.80
Total variable revenue	**$2,677.57**	**$2,558.98**	**$2,302.37**	**$2,486.02**	**$10,024.94**	**$2,506.23**
Variable revenue as a % of total revenue	9%	8%	8%	8%	8%	8%

Table 12 Fixed Revenue by Charge Category

Fixed Revenue (18-19$)						
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**Total**	**Average**
Fixed WaterNSW Charge – offtake customers	$19.92	$19.72	$20.04	$18.87	$78.56	$19.64
Fixed WaterNSW Charge - EW	$27,021.11	$26,814.78	$26,570.24	$26,373.56	$106,779.69	$26,694.92
Fixed maintenance and operational charge - EW	$1,595.96	$1,598.33	$1,587.10	$1,585.28	$6,366.66	$1,591.66
Fixed electricity charge - EW	$28.66	$28.65	$28.66	$28.65	$114.63	$28.66
Total fixed Revenue	**$28,665.64**	**$28,461.48**	**$28,206.04**	**$28,006.36**	**$113,339.53**	**$28,334.88**
Fixed revenue as a % of total revenue	91%	92%	92%	92%	92%	92%

Our approach on pricing is discussed further in section 17 of this submission.

The dollars values in this pricing proposal for the:

- 2019-23 period are expressed in 2018-19 real dollars; and
- historic period (prior to 2019-20) are expressed in nominal dollars,
- exclude GST,

unless otherwise stated

10. RAB

10.1 Summary

The allowances of the return on and of capital are allowances based on the RAB. WaterNSW proposes to establish a RAB for the pipeline to calculate the capital cost of the pipeline. The capital cost for the offtake assets will be calculated using an annuity. The total pipeline RAB amounts to $458M as at 2018-19, comprising the total costs incurred by WaterNSW during the design and construction phase of the pipeline, inflation, financing costs, and a minor cost component for land purchases and renewals for the 2019-23 regulatory period.

The RAB will be deprecated from 2019-20 using the straight-line method and assuming an 80-year useful life for the pipeline.

Over the 2019-2023 regulatory period, the total pipeline RAB (18-19$) for the pipeline is expected to reduce by 4.88 per cent in real terms, as additions to the RAB are expected to be below forecast depreciation.

The RAB is summarised in Table 13 below (18-19$) for the 2019-23 regulatory period.

Table 13 RAB roll forward total RAB (pipeline RAB)

$'000	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
	Step 1 - RAB Roll Forward (nominal)		Step 2 - Forecast RAB (2018-19$)			
Opening RAB	0	265,925	457,560	452,340	446,621	440,901
+ Capex/Additions	262,642	182,703	500	0	0	54
- Disposals	0	0	0	0	0	0
- Depreciation	0	0	5,719	5,719	5,719	5,720
+ Indexation*	3,283	8,932	0	0	0	0
Closing RAB	265,925	457,560	452,340	446,621	440,901	435,236

* Forecast June to June CPI of 2.5% (for both FY18 and FY19) has been applied to the RAB, as a placeholder for this pricing proposal. This is the standard IPART approach to inflating the RAB. This forecast will be updated for actual June to June inflation as per the IPART approach. In contrast, WaterNSW will apply the ABS March to March CPI and the ABS March to March Wage Price Index (WPI) to inflate the relevant costs under the O&M contract, in accordance with the terms of the contract.

10.2 Methodology

As IPART's determination for the pipeline will be the inaugural determination, an initial (or opening) RAB for the pipeline needs to be established. As the construction phase of the pipeline is to occur over two financial years prior to IPART's determination, we are proposing to use the RAB roll forward methodology previously applied by IPART in determining regulated charges for the NSW water industry across those two years.

As noted in 10.1 above, WaterNSW is proposing to establish a RAB for the pipeline and quantify a fixed annuity payment for the offtakes to recover the capital cost of the offtake assets. The proposal to form separate capital accounts (a RAB for the pipeline and annuity for the offtake) reflects WaterNSW's intention to levy separate water delivery charges to Essential Water and for each offtake outlet. Our approach on pricing is discussed further in section 17 of this submission.

The 2019-20 Opening RAB (or the closing RAB for 2018-19) for the pipeline has been formed using the following formula applied to the 2017-18 and 2018-19 financial years:

Subsequent Year Opening RAB = Prior Year Opening RAB + (Actual Expenditure + Financing Costs) + RAB Inflation

Actual expenditure consists of all expenditure incurred by WaterNSW in delivering the pipeline. See section 10.3.

The financing costs have been calculated by applying the real post tax weighted average cost of capital (WACC) on the monthly expenditure profile for the build phase of the project for the relevant year. This is discussed further in section 10.7.

RAB Inflation for the year has been applied to the opening RAB and 50% of the expenditure which enters the RAB in the relevant year, as per the IPART approach. That is:

RAB Inflation = (Opening value + 50% of capex - 50 % of disposals) x June to June inflation factor[21]

WaterNSW has not applied depreciation to the pipeline RAB during the 2017-18 and 2018-19 financial years, as the pipeline is not expected to enter service during this time. Further, WaterNSW will not receive a regulatory depreciation allowance during this period, as the pipeline is currently not subject to an IPART determination.

10.3 Pipeline RAB

WaterNSW proposes an 2019-20 Opening RAB in the amount $458 million.

Table 14 Pipeline RAB roll forward

$'000	2017-18	2018-19
	Step 1 - RAB Roll Forward (nominal)	
Opening RAB	0	265,925
+ Capex/Additions	262,642	182,703
- Disposals	0	0
- Depreciation	0	0
+ Indexation	3,283	8,932
Closing RAB	265,925	457,560

The amounts in the Capex/Additions line is comprised of the following elements

- contractor costs for construction of the pipeline. The D&C contract is a fixed price contract $330 million subject to specified variations. To date, the following variation has occurred:
    - change of pipe size from 559 to 762 diameter past the third pump station as outlined in section 5.2.2 above - $1.4 million
- distributed costs, which are prorated based on the contractor costs for the pipeline (i.e. $330 million minus the cost of the offtakes) as a proportion of the total costs of the project[22], including:

[21] The inflation rate applied in this submission is 2.5% per annum to inflate the RAB in 2017-18 and 2018-19, which is a forecast of June to June inflation for the relevant year. In contrast, WaterNSW has applied ABS March to March CPI to inflate the cost under the O&M contract, in accordance with the terms of the contract.

[22] Including the component of the project which is not funded by regulated sources i.e. SP2, SP3, see section 10.5

- a contingency for future variations at P90 (90% confidence)[23]. This amount will be updated throughout the construction phase. We will provide an update of actual variations and residual contingency to IPART closer to time of the final determination.

- costs of WaterNSW in procurement of the contractor, managing the project (internal and external costs), land rental, and corporate overhead costs.

- costs of the independent verifier
- construction insurance costs
- the costs of financing the project until the time of the determination based on a:

  - real post tax WACC of 4.5% for costs incurred from August 2017 through to mid-January 2018 based on IPART's August WACC 2017 update

  - real post tax WACC of 4.3% for costs incurred from February 2018 through to mid-June 2019 based on IPART's February WACC 2018 update.

A breakdown of expenditure comprising the pipeline RAB is shown in Table 15 Total Expenditure by Category – pipeline RAB below.

Table 15 Total Expenditure by Category – pipeline RAB

Total Expenditure by category (nominal $) – pipeline RAB			
$'000	**2017-18**	**2018-19**	**Total**
Pipeline from Murray River to Broken Hill, including river intake structure, pump stations and Bulk Water Storage	200,966	127,559	328,525
Contract variations	421	1,106	1,527
Distributed costs - WaterNSW costs (internal, external and overhead)***	31,876	20,366	52,242
Distributed costs - Contingency	25,028	15,991	41,019
Funding costs **	4,351	17,681	22,032
Total	**262,642**	**182,703**	**445,345**

* table reconciles with Table 14 Pipeline RAB roll forward (sum of capex/additions i.e. excluding the indexation component).
** excludes funding costs associated with the farm offtakes.
*** includes $3.525M of costs incurred in 2016-17 during the tender/planning phase of the project, attributed to the pipeline as a distributed cost. See Table 18 for more details.

As with any construction project, unforeseen contingencies may arise which may delay the conclusion of the project beyond the time of IPART's determination. If that were to occur, and if that was to result in additional variances or costs to WaterNSW, WaterNSW will seek inclusion of these additional amounts into the RAB at the subsequent price determination.

Sections 4 and 5 above describe in detail WaterNSW's procurement process and strategy in ensuring that the lowest whole of life cost was achieved for the construction of the pipeline. In this way, the prudency and efficiency of these costs was ensured.

[23]This contingency has been prepared by an external consultancy, Advisian, based on P90.

10.4 Offtakes Annuity

Currently, the estimated cost of the offtakes incorporates the following elements:

- contractor costs for installation of 3 offtakes (total of ~250k)
- the cost of financing the installation of the offtakes (total of ~17k).

A breakdown of expenditure for the offtake assets is shown in Table 16 below.

Table 16 Total Expenditure by Category – offtake assets

Total Expenditure by category (nominal $) – offtake RAB			
$'000	**2017-18**	**2018-19**	**Total**
Farm offtakes	152	98	250
Funding cost	3	13	17
Total	**155**	**112**	**267**

One offtake will be installed for the landholder at the bulk water storage as part of the negotiations to acquire land for the storage facility. The capital cost of this offtake has been excluded in the capital cost calculations which are used as an input for regulated prices.

WaterNSW considered the following approaches to recover its capital cost of constructing the two offtakes (89k per offtake outlet[24]) where there is an expectation of receiving a rate of return for these assets (i.e. excluding the offtake installed for the landholder at the bulk water storage):

- RAB building blocks approach: where the capital cost is recovered using a capital account which reflects the depreciation profile of the asset from the time of construction
- Annuity approach: where the capital cost is recovered as a fixed amount over a fixed term irrespective of the method of depreciation used or the depreciation profile of the asset from the time of construction.

Under the RAB approach, an offtake RAB would be established, the capital cost of which would be shared by all offtake customers. The value of the offtake RAB would decline gradually over the useful life of the asset. However, should new customers request an offtake at a later date, then the new offtake asset would enter the RAB, altering the value and depreciation profile of the RAB, causing some customers to pay for the capital cost of the new offtakes. WaterNSW considered this approach to be ill suited for calculating the capital cost of a small asset such as an individual offtake, which is used by one customer.

In the interests of transparency, WaterNSW has constructed an annuity payment to fund the costs of constructing each offtake along the pipeline[25]. This real flat charge is levied over the economic life of the asset, which compensates WaterNSW for its return on and of capital associated with the installation of the offtakes. Most importantly, the fixed annuity payment is the same for all offtakes irrespective of when the offtake is constructed.

The annuity will only be used to calculate fixed charges for the offtake,[26] plus a small contribution to the pipeline as discussed in section 17.5.

The annuity has been calculated using the following formula:

[24] Total cost of 267k for constructing three offtake outlets as per Table 16, divided by three.
[25] Other than the offtake at the bulk water storage.
[26] As noted above in section 6.3.1, a third offtake will be constructed. The cost of this offtake is part of the transaction to acquire land for the bulk water storage.

Offtake annuity = Capital Expenditure $[\frac{WACC}{1-(\frac{1}{1+WACC})^{-n}}]$

Where:

Capital Expenditure = the average capital cost of each offtake. This is:

- 89k if the offtake is installed 2018-20, derived from a total costs of $267k divided by 3 offtakes
- 77k if the offtake is installed during the determination period (2020-23). This cost has been sourced from the O&M contract[27].

WACC = Real Pre-Tax WACC of 5.28% for the water sector from the IPART WACC February 2018 Market update [28]

n = the 20-year contractual term

This annuity component is incorporated into the fixed charge for each offtake outlet. A small contribution to the pipeline equalises the fixed charge for all offtake outlets, irrespective of when the asset was constructed, as shown below (using the charges from 2019-20 as an example). Noting from an engineering perspective, it is preferable that the offtakes are installed during construction of the pipeline.

Table 17 Offtake charges levied in 2019-20 by year of installation

	Offtake installed 2018-19	Offtake installed 2019-20
Annuity (18-19$)	$7,310	$6,352
Contribution (18-19$)	$2,648	$3,606
Total Fixed Charge (18-19$)	$9,958	$9,958
Total Variable Cost at 10ML usage (18-19$)	$3,213	$3,213
Total Costs (18-19$)	**$13,171**	**$13,171**
Total Costs (nominal$)	**$13,500**	**$13,500**

10.5 Distributed Costs

As mentioned in section 10.3, WaterNSW has included in the RAB a component of 'distributed costs' which has been apportioned to the pipeline. Distributed costs are shared between the pipeline project and two additional construction projects for infrastructure that will be transferred to Essential Energy upon completion and that are not the subject of this pricing proposal (called Separable Portions 2 and 3 or SP2 and SP3[29]).

This section describes the method we have applied in apportioning the 'distributed cost' to the pipeline RAB as well as the rationale for seeking to include these costs in the starting RAB.

[27] See Table 57 Capital Charge - Additional Offtakes for more information.

[28] A pre-tax WACC has been used to compute the annuity in lieu of a regulatory tax allowance typically used under the RAB building blocks approach.

[29] SP2 are additional works from the bulk water storage to the Essential Water's Mica Street filtration plan. SP3 are the grid connections described in section 5.2.6

The pool of distributed cost is established by identifying all internal and external costs required to deliver the pipeline in accordance with the Pipeline Direction issued to WaterNSW to construct, operate and maintain the pipeline. That is, the incremental cost of delivering the pipeline project.

Most of these costs can be capitalised under accounting principles, being necessarily incurred in the creation of an asset which provides economic value. However, some of the expenditure is categorised under accounting principles as operating expenditure. Operating expenditure is typically recovered from regulated revenue as a cost forecast under an existing determination allowance. However, no such determination is in place for the pipeline and hence these cost elements are unfunded.

Any unfunded cost elements would need to be offset by revenue derived from WaterNSW's regulated customers in the rural valleys or in Greater Sydney or through additional debt funding. This would impact on WaterNSW's service delivery obligations in these areas, which is not intended by the Pipeline Direction.

Instead our proposal seeks to include these costs in the RAB, as a means of recovering these costs retrospectively. Consequently, we did not distinguish between operating expenditure and capital expenditure in identifying the pool of cost distributed to the RAB. We seek the inclusion of these cost in the RAB regardless of their accounting treatment.

Our approach is consistent with the 16A direction issued to IPART, which requires IPART to include an amount or factor in its methodology representing the efficient costs of complying with the Pipeline and Construction Directions.

The distributed costs, once identified, were allocated to the pipeline RAB by applying an uplift rate 28% to the total contract value of the regulated portion of the project. For example, WaterNSW has applied 28% to the D&C contract value for the pipeline (excluding the cost of the offtakes) of approximately $330 million. It should be noted that contingency forms a part of the 28% uplift applied to the contract value of the pipeline. This is discussed further in section 10.6.

Distributed costs have been allocated solely to the pipeline RAB, as most of the distributed costs has been directly incurred in the construction of the pipeline asset, not the offtake assets[30].

Table 18 below sets out the calculation of the uplift factors for the distributed cost (all cost are cumulative up to end of 2018-19).

[30] The offtakes are incidental to the pipeline and not a primary driver of the cost.

Table 18 Calculation of Distributed Costs

Distributed Costs Design and Construct – 18-19$	$'000
Distributed Costs (A)	
Independent Verifier	$5,028
Direct Project Costs (planning) *	$14,500
External Contract Costs	$15,244
Internal WaterNSW Costs	$10,404
Contingency	$58,465
Total Distributed Costs **(A)**	$103,641
Project Value (D&C) (B)	
Total Contract Value (D&C) including variations	$367,037
Minus offtake expenditure	$250
Total Contract Value (D&C) minus offtakes	$366,787
Total Project Value = Distributed cost + Total Contract Value **(B)**	$470,428
Total Contract Value on Total Project Value (A/B)	
Percentage uplift from D&C Contract **(A/B)**	28%
Attributed to Contingency (described in section 10.6)	12%

* includes $3.917M of cost incurred in 2016-17 during the tender/planning phase of the project.

10.6 Contingency

An estimate of contingency has been included in the cost assumptions for the RAB, to enable IPART to estimate the required revenue for the pipeline project. The contingency estimate is expected to be replaced with actual costs in the lead up to the Final Determination. The contingency forms part of the 28% uplift rate used to compute the distributed costs as per Table 18.

WaterNSW engaged Advisian Pty Ltd to prepare a risk adjusted final forecast cost estimate following the award of the D&C contract. The cost estimate included the value of the D&C contract, WaterNSW's internal and external costs (inclusive of SP2 and SP3) and a P90 estimate on final costs.

Advisian applied the following process in preparing its estimate of contingency:

- reviewed the WaterNSW Project Risk Register
- undertook preliminary briefing with WaterNSW on key risk issues
- amended and developed an initial quantitative risk assessment for presentation and discussion at a risk workshop.

Advisian's analysis was focused on the residual risks to WaterNSW following the award of the D&C contract. Each risk item in the risk register was re-examined to determine whether the risk has been transferred, mitigated, or negated. Advisian also considered new risks which had not

been previously identified or considered. Provision for variability to the value of the D&C contract was modelled as part of the analysis.

A proportion of the contingency has been applied to the pipeline RAB, as it is focused on determining the final cost estimate for construction of the pipeline asset.[31]

10.7 Financing Costs

Financial capital maintenance requires WaterNSW to receive a revenue stream sufficient to cover its expenses over the useful life of the asset, while maintaining a net present value (NPV) neutral outcome for WaterNSW.

In accordance with the principles of financial capital maintenance, WaterNSW has calculated its financing costs incurred during the planning and build phase of the project by applying the WACC to a monthly expenditure profile for the project as projected by the JHJV (including an uplift for distributed costs). The WACC is the appropriate rate by which to compute the financing costs, as it represents the sum of weighted average returns expected from the two types of financing arrangements which have been utilised for the pipeline – debt and equity.

WaterNSW has applied the following WACCs to calculate the financing costs of the pipeline:

- real post tax WACC of 4.5% for contractor costs incurred (inclusive of distributed costs) from August 2017 through to mid January 2018 based on IPART's August WACC 2017 update using WACC parameters for the Water Sector.

- real post tax WACC of 4.3% for costs incurred (inclusive of distributed costs) from February 2018 through to mid June 2019 based on IPART's February WACC 2018 update using WACC parameters for the Water Sector.

For costs which are expected to be incurred from August 2018 through to June 2019, IPART may decide to update the WACC assumptions using the latest WACC market updates expected to be released in August 2018 and February 2019.

Our approach to calculating the cost of finance is consistent with the cash flow assumptions applied by IPART in its rural valley determination for the revenue associated with the return on assets, where WaterNSW a receives rate of return (WACC) on capital, as the expenditure is incurred. That is, regardless of whether the asset has been commissioned.

WaterNSW's forecast of funding costs can be found in Table 19 below.

Table 19 Funding Costs

Total Funding Cost (real $)			
$'000	**2017-18**	**2018-19**	**Total**
Funding costs*	4,354	17,695	22,049

*real dollar value in the year in which funding costs accrue, as funding cost were calculated using a real post tax WACC as per the IPART methodology (for example funding costs in 2017-18 are expressed in 17-18$, and funding costs in 2018-19 are expressed in 18-19$). Includes funding cost of the pipeline and farm offtakes (~ $17 in Table 16 plus $22,032 in Table 15). Note that indexation is applied to the funding cost as part of the RAB roll forward methodology. This calculation ensures that funding costs enter the RAB in nominal dollars. See Table 20 for more details.

10.8 Forecast RAB

Table 20 Pipeline RAB Roll Forward below sets out the forecast RAB for the pipeline over the four years of the determination period. This has been done by adding to the 2019-20 Opening

[31] With a relevant portion applied to SP2 and SP3.

RAB the proposed capital expenditure for each year of the determination and subtracting depreciation and disposals:

Closing RAB = Opening RAB + Forecast Capex - Forecast Depreciation – Forecast Disposals

Table 20 Pipeline RAB Roll Forward

$'000	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
	Step 1 - RAB Roll Forward (nominal)		Step 2 - Forecast RAB (2018-19$)			
Opening RAB	0	265,925	457,560	452,340	446,621	440,901
+ Capex/Additions	262,642	182,703	500	0	0	54
- Disposals	0	0	0	0	0	0
- Depreciation	0	0	5,719	5,719	5,719	5,720
+ Indexation	3,283	8,932	0	0	0	0
Closing RAB	265,925	457,560	452,340	446,621	440,901	435,236

* Forecast inflation of 2.5%, as a placeholder for this pricing proposal. It is proposed that this forecast be updated for June to June inflation as per the IPART approach.

WaterNSW has adopted the straight-line method for calculating forecast depreciation of the RAB over the 2019-2023 regulatory period, ensuring the value of WaterNSW's assets are depreciated in equal instalments over their useful life.

WaterNSW applied a useful life of 80 years for both new and existing depreciating assets. This follows the IPART 2017 and ACCC 2014 determination for rural valley bulk water prices, where both IPART and the ACCC applied a useful life assumption of 80 year for new pipeline assets. This is discussed further in section 11 of this proposal.

Over the 2019-2023 regulatory period, the RAB (18-19$) for the pipeline is expected to reduce by 4.88 per cent in real terms, as additions to the RAB are expected to be below forecast depreciation.

No disposals for the pipeline are anticipated for the period of the determination.

10.9 Forecast Capital Expenditure

As the pipeline and the associated infrastructure is new, the additional capital expenditure (capex) requirements over the term of the determination is small. This comprises of two components:

- asset replacement costs as part of the general ongoing maintenance of the assets, which consists mainly of highway turnout points, bulk storage cell and batteries (~54k in 18-19$). This cost is sourced from the O&M contract
- cost of land acquisition (~500k in 18-19$).

Over the O&M contract term, the contractor will be paid based on the lower of actual asset replacement costs incurred and the cumulative asset replacement cost profile bid by the contractor in its tender (adjusted for indexation). Overall, this mechanism both ensures that the contractor is held accountable to their bid price.

The forecast capex requirement over the term of the determination is set out in Table 21 Forecast capital expenditure below.

Table 21 Forecast capital expenditure

$'000	2019-20	2020-21	2021-22	2022-23	Total
Capital Expenditure	500	0	0	54	554

11. Depreciation/Asset lives

11.1 Pipeline RAB

WaterNSW has:

- adopted the straight-line method for calculating forecast depreciation of the RAB over the 2019-2023 regulatory period
- applied a useful life assumption of 80 years for existing and new depreciating assets (i.e. to the value of the pipeline assets and renewals work on the pipeline).

A useful life of 80 years was used by both IPART and the ACCC for their respective rural valley bulk water determinations for rural valley pipeline assets. As a rural valley asset, an 80-year useful life is deemed appropriate in establishing the depreciation rate of the pipeline RAB.

In the 2014 ACCC determination, the ACCC commissioned Deloitte to undertake a review on rural valley asset lives for the 2014 ACCC determination on rural valley bulk water prices. Deloitte:

- observed that the median useful life of new pipeline assets was 55 years (based on information obtained from other service providers)
- referenced the ATO tax ruling, which recommended a useful life of 80 years (noting that the tax ruling presented a number of different categories of pipelines)
- recommended an extended useful life of 80 years for rural valley pipeline assets, on the basis that future pipelines are likely to be large diameter and relatively low pressure. Hence Deloitte suggested an asset life at the higher end of the range.

The ACCC applied the recommendations in the Deloitte report in its 2014 ACCC Determination on Murray Darling Basin bulk water charges.

In the 2017-21 IPART determination on rural bulk water prices, IPART also applied a useful life assumption of 80 year on the value of forecast renewals capex in the Fish River Scheme (a piped supply scheme), as per WaterNSW's pricing proposal, and consistent with the 2014 ACCC Determination. [32]

The ATO Tax Ruling *2017/2 - Income tax: effective life of depreciating assets*, also proposes an effective life of 80 years for 'water mains', under the industry *'water supply (18110)' and* 'pipes' under the industry *'irrigation water providers (28110)'.*

WaterNSW has forecast approximately 500k of capital expenditure in 2019-20 related to land acquisitions. Land is treated as a non-depreciating asset and hence has not been depreciated from the RAB.

The regulatory depreciation allowance (or RAB depreciation) is shown in Table 22 Depreciation of pipeline below.

[32] The useful life of 80 years was applied to approximately $4.4M of pipeline renewals work planned in the Fish River Scheme over the 2017-21 period.

Table 22 Depreciation of pipeline

Calculation of depreciation – pipeline RAB ($'000)					
	Asset value		**Useful life**		**Depreciation**
Depreciation of existing assets	457,560	/	80	=	5,719

*depreciation of new assets has been excluded from the table as the impact to the RAB is minor

The useful life of existing assets should be revisited in subsequent prices reviews to ensure alignment with the asset's actual/observed useful life.

11.2 Offtake annuity

WaterNSW has applied a payment period of 20 years to compute the annuity for offtake assets based on the economic life of the asset. The economic life refers to the 20-year contractual term entered into between WaterNSW and the offtake customers for the provision of pipeline/offtake services. This is the period in which the offtakes assets are expected to be revenue generating assets.

12. WACC

12.1 Introduction

WaterNSW is proposing a post-tax weighted cost of capital (WACC) consistent with the IPART methodology set out in IPART's Final Report "Review of our WACC Method" February 2018 (IPART Final WACC Report), with annual updates.

The WACC is the minimum ("benchmark") financial return an investor requires from an investment given its risk. It is the sum of weighted average returns expected from the two types of capital invested – debt and equity. WaterNSW needs to recover a rate of return on the capital invested into the pipeline assets.

In determining the appropriate WACC economic regulators, such as IPART, strive to provide an allowance as reasonably accurate as possible to ensure that customers do not pay more than necessary and that the regulated firms will be financially viable and have the incentive to invest in the efficient level of productive assets[33].

We consider our approach, described below, will provide an allowance that closely covers our actual efficient cost of capital, and is in the best interests of customers.

12.2 IPART's Method for determining the appropriate WACC

IPART's method for estimating and determining the WACC was reviewed during 2017 and its updated methodology published in the IPART Final WACC Report (the IPART Methodology). We propose that IPART adopt this methodology in its determination for the pipeline.

The real post-tax WACC is calculated as follows:

$$WACC = \left\{ \frac{\left[1 + \left(Kd\frac{D}{V} + Ke\frac{E}{V}\right)\right]}{1+i} \right\} - 1$$

where,

Kd = nominal cost of debt

Ke = nominal cost of equity

D = value of debt capital

E = value of equity capital

V = value of firm = D + E

D/V = leverage

I = expected inflation

and where the nominal cost of debt, Kd, is estimated based on:

$$Kd = R_f + DRP + IC$$

where

Rf = Risk-free rate

DRP= debt risk premium

IC = debt issuance/raising costs

[33] Page 14, IPART Final WACC Report.

DRP+IC = debt margin

and where the nominal cost of equity, Ke, is estimated based on:

$$Ke = R_f + MRP\ x\ \beta$$

where

Rf = Risk-free rate

MRP= market risk premium

B = equity beta

The IPART Methodology is to estimate the WACC based on a 50% short term and 50% long term approach, utilising a mid-point estimate of the range, and apply adjustments if its uncertainty index is outside a standard deviation of 1; using market data to observe the inputs.

12.3 Proposed WACC

IPART publishes market updates in February and August annually to provide stakeholders and investors with guidance on what its WACC decisions would look like based on prevailing market conditions.

Using IPART's February 2018 WACC Market Update, the WACC in Table 23 would arise, using the WACC parameters for the Water Sector.

Table 23 WACC Parameters February 2018

WACC Parameter	'current market data'	'Long term averages'
Nominal risk free rate	2.7%	3.9%
Inflation	2.5%	2.5%
Debt margin	1.8%	3.2%
Debt to total assets	60%	60%
Market risk premium	9.1%	6.0%
Gamma	0.25	0.25
Equity beta	0.7	0.7
Cost of equity (nominal post-tax)	9.1%	8.1%
Cost of debt (nominal pre-tax)	4.5%	7.1%
Real post tax WACC	3.7%	4.9%
Mid-point WACC based on 50:50 approach	**4.3%**	

12.4 Cost of Debt

In the IPART Final WACC Report, IPART has adopted an approach to providing the cost-of-debt allowance as follows:

- **50% short term trailing average:** based on 40-day confidential observation period at a time close to the commencement of the regulatory period, and annually thereafter, effecting a

trailing average approach with term aligned to length of regulatory period

- **50% ten-year trailing average:** based on 10-year average of daily/monthly observations.

The allowance is based on RBA non-financial corporation 10-Year BBB/Baa2 credit spreads, published monthly on the RBA website.

A consequence of moving to a trailing average approach is that IPART will sample debt inputs, such as the risk free rate and the debt margin over a particular window of time (an averaging period) in the years prior to the release of its Draft and Final Determination. The averaging period is expected to be notified by IPART to WaterNSW ahead of the release of its Draft and Final Determination. Once notified by IPART, WaterNSW will provide a confidential submission to IPART on the appropriate averaging period proposed by IPART to compute the cost of debt inputs for the WACC in its Final Determination.

12.5 Equity Beta

The Equity Beta is an industry risk measure. IPART's determined equity beta for the water industry is 0.7. WaterNSW considers that this is reasonable for the pipeline determination and sees no basis to depart from the industry measure.

12.6 Market Risk Premium

The IPART Methodology uses the sharp-litner capital asset pricing model, with the market risk premium being an average of 50% observed short-term market data, and 50% long term average.

12.7 Selection of Proxy Firms

In the IPART Final WACC Report, IPART notes that it will publish its criteria for proxy selection, and its list of comparator companies that meets its criteria at the start of the price review and will give stakeholders the opportunity to propose additional comparable industries that meet its criteria, but not individual stocks.

WaterNSW looks forward to receiving the criteria and list of comparator companies from IPART and will provide its feedback through the review process.

12.8 Annual Updates

In the IPART Final WACC Report, IPART indicated it would consider either

- NPV-neutral true-up at the commencement of the following regulatory period; or
- annual updates

to implement the cost-of-debt trailing average approach.

WaterNSW requests that IPART allow annual updates for the pipeline determination, on the following basis:

- **Customer interests**: annual updates provide smaller, incremental price changes to customers and reduce price-shocks at regulatory reset dates. Not allowing adjustments within a regulatory period can lead to significant price movements in a subsequent regulatory period.

  For example, under the true up approach, significant price shocks may occur in a post 2023 regulatory period should interest rates rise over the 2019-23 determination period (particularly if interest rates move in the same direction in each year). WaterNSW is particularly concerned about this risk given that water bills can have a material and direct impact to the end user.

  The potential quantum of the price volatility should also be considered in assessing the preferred method for adjusting the cost of debt allowances. Note that Australia's interest rates are currently at relatively historic lows. TCorp analysis suggests that interest rates (TCorp 10-

Year Yield) are likely to rise by up to 100 basis points in 2021 from current levels.[34] We note that customer research has revealed a customer preference for gradual price adjustments over time as opposed to significant step changes in customer charges. [35]Under a true up approach, not only is there an adjustment for the cost of debt, there is also an adjustment for inflation, which has a compounding effect on the cost of debt under a true up calculation (and which is absent under the annual update approach), leading to further price volatility concerns.

- **Cashflow timing impacts**: without annual updates, the cashflow impact of differences between the cost-of-debt allowance and actual interest costs are borne by the firm – and may impact on cashflow coverage ratios and credit ratings – particularly at higher leverage, where a firm is close to debt covenants or has weak credit rating outlook. This may impact the financeability of the firm, particularly if the firm needs to raise additional debt to fund capital or operating expenditure not factored into the determination allowances and caused by unforeseen circumstances, an outcome which is not in the best interest of customers. A trailing average with annual updates allows the firm to properly align its actual costs with the cost-of-debt allowance to mitigate the cashflow risks described above.
- **Incentive to incur efficient debt raising costs:** Under annual updates, the aim is to determine an annual cost-of-debt allowance which reflects, as much as possible, the actual interest costs expected to be incurred by a prudent and efficient firm, in each year of the regulatory period.

  Not only would the alignment described above improve the financeability of the firm and its credit rating (providing long term benefits to the customer), it would also provide an incentive for the firm to adjust its debt raising practices on an annual basis so as to incur debt raising costs which align with the benchmark allowances (also updated annually) – matching or beating the benchmark allowances. For instance, a reduction in the cost of debt, triggered by prevailing market conditions, would not only lead to a decline in customer charges under an annual update approach, but also incentivise the firm to incur actual debt cost in line with prevailing market conditions and the benchmark allowance, on an annual basis.

[34] See Figure 3 and Figure 4 in WaterNSW's response to the IPART Draft Report on its WACC Methodology Review 2017 < https://www.ipart.nsw.gov.au/files/sharedassets/website/shared-files/investigation-submissions-sea-wacc-methodology-2017/draft-report/online-submission-waternsw-c.-charlier-8-dec-2017-163300000.pdf>

[35] Ibid. See Reference to the National Customer Perceptions Study conducted for the Water Services Association of Australia (WSAA) by InSync.

13. Tax allowance

13.1 Introduction

WaterNSW has included in its proposed notional revenue requirement its estimated tax liability or the regulatory tax allowance, in accordance with IPART's decision on the *Incorporation of Company Tax in Pricing Decisions*.

The first step is to estimate taxable income. In simple terms, this considers gross income, tax depreciation, tax deductions a (including deductible interest) and tax losses. The estimated taxable income is then multiplied by the corporate tax rate (with an appropriate adjustment for franking credits) to determine the tax bill for the pipeline services.

WaterNSW has used a notional gearing ratio of 60:40 debt to equity to compute the interest deductions for the tax allowance. This is the standard IPART approach, which also aligns with WaterNSW's actual gearing ratio forecast as specified in the SCI.

There two elements of the regulatory tax allowance which are discussed further in this section:

- the accumulated tax losses
- tax depreciation.

13.2 Tax losses

As a state-owned corporation, WaterNSW must apply the relevant National Tax Equivalent Regime (NTER) however IPART does not factor into its pricing decisions actual tax losses. Instead, IPART requires expected tax losses to be rolled forward for each subsequent year of the regulatory period, with a starting balance of zero from the formation of the tax asset base.

Consistent with the IPART methodology, WaterNSW has assumed that the SPV will have a zero balance for accumulated tax losses as at 2019-20.

13.3 Tax depreciation

IPART typically uses the agency's forecast of tax depreciation to calculate the regulatory tax allowance. There are two assumptions for IPART to consider:

- the effective life of depreciating assets for tax purposes
- the rate at which the assets are depreciation (e.g. prime method or diminishing method).

WaterNSW's has calculated its tax depreciation forecast using a methodology which would be reflected in the annual financial reports for the SPV.

Pursuant to *ATO TR 2017/2 - Income tax: effective life of depreciating assets*, WaterNSW has applied an effective life for 'water mains' of 80 years, under the industry *'water supply (18110)'.* This is the same assumptions for 'pipes' under the industry *'irrigation water providers (28110)'.* An 80-year effective life is also consistent with the assumptions used in forming the pipeline RAB in section 10.

As a newly formed entity, the SPV will be able to elect from either the prime cost method or the diminishing depreciation method, and once an election is made, it is generally not possible to amend the chosen approach.

WaterNSW will adopt the prime cost method to calculate the tax depreciation forecast for the 2019-2023 regulatory period. The prime method is consistent with the expected wear and tear of the pipeline asset. The SPV is not expected to run down its assets in the first half of its useful life

as implied under the diminishing method, instead the assets will be run down over its expected life span of 80 years.

WaterNSW has forecast a regulatory tax allowance of $1.1 million per annum across the 2019-23 regulatory period. The regulatory tax allowance for the 2019-23 regulatory period is shown in Table 24 below.

Table 24 Tax Allowance

Tax Allowance (2018-19 $)						
Total costs $'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
Tax Allowance	1,087.1	1,115.8	1,140.8	1,165.0	4,508.7	1,127.2

In the subsequent regulatory periods, it is anticipated that WaterNSW will update the tax allowance in line with the SPV's actual tax depreciation using the SPV's actual tax base.

14. Working capital

An additional building block is working capital. The difference between current assets and current liabilities arising from the timing differences between accounts payable and accounts receivable, creating a financial liability for WaterNSW.

IPART's methodology of determining the working capital allowance is generally based on a 45-day payment term for account receivable and a 30 day payment term for accounts payable. The calculation for the working capital allowance is as follows:

$$\left[Accounts\ Receivables\ X\ \frac{Creditor\ Days}{365} - Accounts\ Payable\ X\ \frac{Debtor\ Days}{365}\right] X\ WACC$$

IPART typically uses the revenue from the year prior to compute accounts receivables. However, as the pipeline has not been commissioned, WaterNSW has applied, for accounts receivables, the revenue requirement for the current year, instead of the revenue accrued in the year prior.

The proposed working capital allowance is set out in Table 25 Working Capital Requirements below. This is a small amount and has been included in notional revenue requirement.

Table 25 Working Capital Requirements

Working Capital Allowance (2018-19 $)						
Total costs $'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
Working Capital Allowance	136.4	143.1	141.5	140.6	561.6	140.4

15. Sales volume forecast and customer numbers

15.1 Sales volume forecast

Sales volumes are a major driver of operating expenditure for the pipeline (through the cost of electricity), as set out below in section 15.1.1, and is also relevant to the tariff structure set out below in section 17. In that section, we explain that we are proposing that our revenue and prices be based on actual usage by our customers.

However, for illustrating what our proposed revenue requirement will be (assuming average usage) and what customer tariffs will be (assuming average usage), we have produced a forecast of demand over the proposed determination period and beyond. We engaged GDH Advisory to produce this forecast (GHD Forecast).

15.1.1 GHD Forecast

The GHD Forecast presents a projection of the water demand for the pipeline mainly based on the historical consumption data for Broken Hill covering the years 1998 to 2017 as provided by Essential Water. GHD used a linear regression model based on this 20 years of historical data and made two projections of the annual water demand for pipeline for 2019 to 2027.

The first projection is based on a 20-year history of data and results in a steady decline in demand, from a total of 4,968 ML in 2019 to a total of 3,989 ML in 2027. The second projection is based on a 10-year history of data and results in a moderate increase in demand, from a total of 6,050 ML in 2019 to a total of 6,449 ML in 2027. Both of these projections include an assumed 400ML per annum for farm offtake consumption.

We consider that the second projection better reflects the likely trends in the underlying factors, specifically the lifting of a downward price effect on demand, and a return to more typical annual rainfall conditions (from the high rainfall periods of 2010-2011 to lower rainfall), both resulting in an increase in demand per domestic dwelling which offsets the general decline in population growth.

The projection based on the 10-year history of data is set out in Table 26 below from the GHD report. We have made an adjustment to the assumed usage farm offtake consumption. We have included a forecast demand of 30ML for the three offtake outlets[36], instead of 400ML in the GHD Forecast (i.e. the maximum available to this class of customers in any one year) to more accurately reflect the number of customers interested in an offtake at the date of this proposal.

Table 26 Projected annual consumption met by the Broken Hill Pipeline – projected from 10-yr history

Consumption (ML per calendar year)	2019	2020	2021	2022	2023	2024	2025	2026	2027
Broken Hill	5,650	5,700	5,750	5,800	5,850	5,899	5,949	5,999	6,049
Offtakes	30	30	30	30	30	30	30	30	30
Total	**5,680**	**5,730**	**5,780**	**5,830**	**5,880**	**5,929**	**6,079**	**6,029**	**6,079**

In additional to the annual consumption projection, GHD also developed a weekly consumption projection for the period 2019 to 2023. This projection is based on the more recent 10-year

[36] 10MLs for each offtake noting offtake customers are not limited to 10MLs of usage. The usage profile of offtake customers is currently unknown. This is a WaterNSW estimate of demand per offtake outlet however customers are free to purchase additional water entitlements.

history of data. We have used the average consumption for each week in a year over the past ten years to profile forecast annual consumption to generate a weekly consumption forecast. The weekly consumption varies between a peak of circa 170 ML/week, taking place in summer, and a trough of circa 80 ML/week, taking place in winter. This yielded an average forecast of 5,746ML over the 2019-23 determination period, which has been used to forecast average electricity cost across the 2019-23 determination period.[37]

We have discussed the GHD Forecast with Essential Water. Essential Water may deviate from our forecast with respect to their own system requirements but we understand that they do not substantially dispute our method.

15.1.2 Variability

As the GHD Forecast is a linear regression of the historical data, there will nonetheless be variability of demand on a year by year basis dependant on the weather conditions experienced at the time. This variability is generally in the order of 500 to 600ML per annum either above or below the average based on a review of the historical data.

Our agreement with Essential Water and the Letter of Intent with the offtake customers preferences the Broken Hill township usage over supplying the offtake customers. On an annual basis, if an increase of 600ML is added over the forecast demand, peak annual capacity of the pipeline at 7,586.6ML per year is unlikely to be reached.[38]

15.2 Customer numbers

The primary customer of the pipeline is Essential Water.

WaterNSW consulted with 14 potential offtake customers situated along the pipeline from Coombah to Broken Hill[39]. After consultation on potential prices, as set out in section 6.3, WaterNSW obtained three expressions of intent to enter into an agreement to become a customer of the pipeline and advised JHJV to construct three offtakes (two for the three landholders who signed the Letter of Intent (see section 6.3) and one offtake for the landholder at the bulk water storage). WaterNSW anticipates that following release on IPART's draft report on proposed prices for the pipeline, WaterNSW will be able to conclude long form agreements with these customers for services from the pipeline.

Once IPART determines pricing for the offtakes, additional landholders may approach WaterNSW with interest in becoming an offtake customer. Our pricing proposal makes provision for additional offtake customers in the operational (post-completion) phase of the pipeline.

[37] The demand from EW has been calculated as 5,635MLs in FY20, 5,687MLs in FY21, 5,757MLs in FY22 and 5,786MLs in FY23. This equates to an average demand from EW of 5,716MLs per annum. The average demand from all customers of the pipeline (including 30MLs of demand from offtake customers) equals 5,746MLs across the 2019-23 determination period.

[38] For example, 5,680MLs of total demand in 2019 as per table 26 plus 600MLs is 6,280MLs which is less than 7,586.6MLs.

[39] A couple of landholders on the other side of Coombah expressed some passing interest in obtaining an offtake and discussions were also had with these landholders.

16. Operating Expenditure

16.1 Introduction

Operating expenditure for the pipeline is predominately comprised of cost of electricity for the pumps to propel the water up the pipeline (50%), fixed operation and maintenance costs incurred by the pipeline contract (32%) and additional on site and corporate labour and overhead costs.

WaterNSW's forecast of operating expenditure requirements for the 2019-23 regulatory period is shown in Table 27 Operating Expenditure Forecast below.

Table 27 Operating Expenditure Forecast

Total Operating Expenditure by category (2018-2019 $)						
$'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
Operation and maintenance	1,595.7	1,597.2	1,586.8	1,585.3	6,365.0	1,591.2
Asset replacement costs**	0.3	1.1	0.3	0.0	1.7	0.4
Electricity payments*	2,706.2	2,587.6	2,331.0	2,514.7	10,139.6	2,534.9
SPV audit costs	100.0	100.0	100.0	100.0	400.0	100.0
SPV contract management costs	220.0	220.0	220.0	220.0	880.0	220.0
Insurance & land tax	131.4	131.4	131.4	131.4	525.7	131.4
SPV Overhead	475.4	463.7	437.0	455.1	1,831.2	457.8
Total Operating Expenditure	**5,229.0**	**5,101.1**	**4,806.5**	**5,006.5**	**20,143.1**	**5,035.8**

* Electricity payments based on assumed average demand of 5,746MLs using the electricity price inputs provided by ACIL, with the expectation of the retail electricity rates for FY19-FY21, which are based on actual contracted retail rates from [redacted]
** total might not sum due to rounding

16.2 Operation and maintenance

The major components of operating expenditure, other than electricity, comprise a fixed (monthly) rate charge under the O&M contract to perform all the operations and maintenance of the pipeline over the 20-year term. This includes staffing costs at the pipeline which is projected to be 3.6 full time equivalent staff (FTEs). These costs are set out below on a per annum basis.

Table 28 Operation and maintenance

Operation and maintenance (2018-2019 $)						
$'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
Operation and maintenance*	1,595.7	1,597.2	1,586.8	1,585.3	6,365.0	1,591.2

* Expenditure under the contract is expressed in real $ as at March 2017. Figures have been inflated using actual ABS March 2017- to March 2018 inflation of 1.9% and forecast March 2018 – to March 2019 inflation of 2.5% as specified by IPART. Note that the contract requires operational and maintenance costs to be inflated by a weighting of 29.46 per cent by the WPI and 70.54 per cent by CPI however the expenditure in this table has been inflated using CPI for simplicity due to the late release of the WPI figures and the timeline for preparation of this pricing submission. WaterNSW will provide an updated (indexed) cost profile during the price review process with actual CPI and WPI for the period March 2017 to March 2018 and March 2018 to March 2019.

The JHJV assumes responsibility for the operation and maintenance of the pipeline in accordance with the O&M contract. The responsibilities include:

- developing, implementing and maintaining a Water Quality Management Plan, such as temperature, PH, and salinity

- developing, implementing and maintaining an Incident Management Plan in line with WaterNSW's requirements
- developing, implementing and maintaining management plans covering project operations and maintenance requirements for health, safety, environment and quality
- monthly reporting requirements providing sufficient detail for WaterNSW to assess performance and compliance with the requirements of the contract, in line with WaterNSW's Operating Licence. The reporting requirements are extensive and include quantity, quality, volumes, energy usage, hydraulic performance, asset management, incident reporting, KPI reporting, fuel usage
- communications and day to day operational issues, including direct communication with Essential Water, and billing WaterNSW in accordance with the O&M contract
- asset management and maintenance, developing, implementing and maintaining an asset management system and asset data requirements, planned/routine maintenance, reactive and unplanned maintenance and other general maintenance services
- meeting WaterNSW's operational performance requirements include:
    - ensuring specified system availability and meeting return to service periods
    - meeting operational demand forecasts provided by Essential Water
    - meeting water quality thresholds at the specified interfaces
    - meeting defined safety and environmental performance indicators
    - continuous monitoring of system performance efficiency and ongoing corrective action if performance does not meet requirements
    - continuous monitoring of system leakage or losses and ongoing corrective action if performance does not meet requirements
- maintaining the water supply system including:
    - regular maintenance and checks to minimise rates of equipment/component failures particularly unplanned failures that will impact on the ongoing system availability
    - scheduled replacement of equipment
    - reactive maintenance and replacement within specified return to service periods
    - regular checks on all equipment/components to ensure ongoing system availability
    - regular auditing of maintenance systems and processes to ensure maintenance
    - activities are being carried out in accordance with an accredited maintenance management system
    - recording of maintenance activities and associated costs to enable WaterNSW to demonstrate prudent and efficient maintenance management practises to relevant regulators

- arranging for an annual independent audit in conjunction with WaterNSW, which must cover the following matters; financial payments, water volumes, water quality, health and safety, maintenance, asset management and other matters as required under the O&M contract.

16.3 Asset replacement costs

This is a nominal amount of operating expenditure which covers planned asset replacement incorporated into the O&M contract reflecting the cost profile bid by the contractor in its tender.

Over the O&M contract term, the contractor will be paid based on the lower of actual asset replacement costs incurred and the cumulative asset replacement cost profile bid by the contractor in its tender (adjusted for indexation). Overall, this mechanism both ensures that the contractor is held accountable to their bid price.

The asset replacement costs are shown below.

Table 29 Asset replacement cost

Asset replacement cost (2018-2019 $)						
$'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
Asset replacement costs	0.284	1.138	0.284	0.000	1.707	0.427

* Expenditure under the contract is expressed in real $ as at March 2017. Figures have been inflated using actual ABS March 2017 to March 2018 inflation of 1.9% and forecast March 2018 – to March 2019 inflation of 2.5% as specified by IPART and in accordance with the contract. WaterNSW will provide an updated (indexed) cost profile during the price review to incorporate actual CPI for the period March 2017 to March 2018 and March 2018 to March 2019.

The contract has also projected additional planned asset replacement of $54k in 2022-23 ($18-19$). The $54k has been incorporated as a capital expenditure item that would enter the RAB, having met the required capital expenditure thresholds. See section 10.9.

16.4 Electricity costs

16.4.1 Overview

Electricity costs are incurred due to the energy needs of the four pump stations which operate to transmit water up the pipeline. As set out in section 5.6 above, the operating schedule of the pipeline will optimise off-peak and shoulder pumping times to minimise on-peak operation. The energy use profile of the pumps at different levels of demand, expected demand and electricity prices are major components in calculating the cost of electricity. The energy use profile of the pumps is set out in the O&M contract as specified by the JHJV through the contract negotiation process.

WaterNSW proposes to offset the cost of electricity using revenue derived from the proposed charges including:

- a fixed electricity charge
- an electricity demand charge, a single rate on water usage which applies at all times
- a variable electricity charge, which varies depending on the amount of water ordered or delivered.

The actual electricity cost of the pipeline is expected include:

- network charges
- retail supply charges
- environmental charges

- metering charges
- ancillary charges
- participant charges
- other charges (e.g. prudential charges).

WaterNSW's forecast of electricity costs are illustrative, assuming an average demand of 5,746MLs per annum. For the analysis, WaterNSW has applied

- actual retail electricity rates to FY21 (using a forecast of loss factors from ACIL Allen)
- benchmark network rates (and other incidental and ancillary electricity tariffs) sourced from ACIL Allen for the 2019-23 period; and
- benchmark (forecast) retail electricity rates from FY22 to FY23 sourced from ACIL Allen.

The electricity forecast for the 2019-23 regulatory period is shown in Table 30 below.

Table 30 Electricity costs

Electricity costs (2018-2019 $)						
$'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
Electricity payments	2,706.2	2,587.6	2,331.0	2,514.7	10,139.6	2,534.9

The formulas used to derive the electricity charges and the associated cost inputs can be found in sections 17.9 to 17.12.

16.4.2 Actual prices

Electricity prices have been sourced by the JHJV from the competitive tender process required under the O&M contract for the regulatory years 2019-20 and 2020-21.

Electricity prices for the remaining years of the determination period (2021-22 and 2022-23) will be sourced under a subsequent tender process expected to be held within the determination period.

As described in section 4.2.4 above, the contractor is responsible for arranging and entering into a PSA throughout the term of the O&M contract. To ensure competitive market rates, the contractor will be required to source three quotes and select the most competitive from these. Overall, this mechanism aims to produce the same competitive pricing outcomes that would be achieved if WaterNSW were to procure the PSA itself (i.e. it will uncover available market prices). WaterNSW will retain review powers over the electricity procurement process.

The tender process has concluded for electricity retail tariffs for the commissioning stage and for the first and second year of the operation of the pipeline (19/20 and 20/21). [redacted] was deemed the successful proponent having demonstrated to the JHJV that its service offering would provide the best value for money, having regard to price, prevailing market conditions and the operating requirements of the pipeline.

The JHJV received offers from three electricity retail providers as part of the tender process. The offers were expressed over periods of 9 months, 21 months or 33 months (commencing 1/10/2018) for periods of peak, off-peak and shoulder. All proponents offered lower average prices over a longer contractual period of 33 months. [redacted] offered the lowest retail rates out of all the proponents.

The JHJV and WaterNSW further queried [redacted] proposed prices, which resulted in a revised offer from [redacted] containing lower off-peak pricing to FY 21 and lower shoulder pricing to FY20. The revised offer was considered appropriate for a pipeline, which is intended to operate efficiently during the cheaper pricing periods of off-peak and shoulder.

Furthermore, the 33-month pricing from [redacted] was considered appropriate for the following reasons:

- the 33 months aligned with the determination pricing cycle (for the regulatory year ending FY 21)
- a longer term aligned with the determination pricing framework, in which prices are generally fixed for a 4 to 5 year period in the interest of price stability
- a longer term was considered appropriate to mitigate the current price volatility observed in the electricity market
- a longer term of 33 months would provide the operator with more time to understand the best and most efficient operating ranges for the pipeline. A shorter term may give a distorted (short term) view of power requirements which may then force the energy provider to further increase their charges in a subsequent tender process.

The retail electricity rates are set out in Table 50 Electricity charge pricing inputs in section 17.10 this submission.

Electricity network tariffs and other ancillary charges are expected to be treated as a pass-through cost under the PSA with [redacted] as determined under the Australian Energy Regulator (AER) annual pricing approval process for network electricity charges. It is considered standard business practice for electricity retailers to pass through to the end user the actual cost of network and other ancillary charges incurred by the electricity retailer. WaterNSW proposes to pass through the actual cost of network and other ancillary charges through an annual update mechanism discussed further in section 17.13.

16.4.3 Forecast and annual update

Retail market electricity prices are generally not available for extended future periods (without building in an uncertainty premium to the price). Therefore, we engaged ACIL Allen to provide us with forecast prices for the proposed 4 year period of the determination. These forecast prices have been used to determine the electricity price for the expected average demand profile described in section 15.1 above and used in generating the illustrative revenue requirement over the term of the proposed determination (see section 17 below)[40]. We have provided the illustrative revenue requirement to provide additional information to IPART, our customers and stakeholders.

We propose to provide an annual update of electricity prices ahead of each year of the proposed determination. The update would replace the ACIL Allen forecast for retail electricity prices for the years 2022-2023 with prices sourced in the market using the method specified in the O&M contract described at section 4.2.4 above.

16.4.4 ACIL Allen methodology

ACIL Allen has used a market modelling approach to estimate the likely cost of electricity the pipeline will incur during the projection period 2018-19 to 2022-23 (noting actual retail prices have been used for 2019-2021. The ACIL Allen methodology estimates costs from a retailing

[40] The revenue requirement is illustrative as we are proposing a price cap rather than a revenue cap due to the variability of demand for the services of the pipeline and the corresponding impact of third party electricity payments.

perspective.

Electricity costs comprise:

- wholesale electricity costs (WEC) for various demand profiles
- costs of complying with state and federal government policies, including the Renewable Energy Target (RET)
- the costs associated with the New South Wales Energy Savings Scheme (ESS)
- National Electricity Market (NEM) fees, ancillary services charges and costs of meeting prudential requirements
- energy losses incurred during the transmission and distribution of electricity to customers
- network costs (including the Climate Change Fund Levy)
- retail margin.

16.4.5 Wholesale electricity costs

ACIL Allen undertook wholesale electricity market simulations to estimate expected pool costs and volatility and the hedging of the pool price risk by entering into electricity contracts with prices represented by the observable futures market data.

The market hedging approach for estimating the WEC utilised ACIL Allen's:

- stochastic demand model to develop 47 weather influenced simulations of hourly demand traces for each region of the NEM and the pipeline – using 47 years of weather data
- stochastic outage model to develop 11 hourly power station availability simulations
- electricity market model, PowerMark, to run 517 (47 by 11) simulations of hourly pool prices of the NEM using the stochastic demand traces and power station availabilities as inputs
- analysis of ASX Energy contract data and the market simulations to estimate contract prices
- hedge model taking the above analyses as inputs, together with an efficient but prudent hedging strategy, to estimate a distribution of hedged prices for the pipeline.

ACIL Allen then analysed the distribution of outcomes produced by the above approach to provide a risk adjusted estimate of the WEC for the pipeline.

16.4.6 Renewable energy policy cost

Costs associated with the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES) have been estimated using the latest price information from broker, TFS, and renewable energy percentages published by the Clean Energy Regulator (CER).

To estimate the costs to retailers of complying with both the LRET and SRES, ACIL Allen used the following elements:

- historical Large-scale Generation Certificate (LGC) forward market prices from TFS for 2018 to 2020

- ACIL Allen projected LGC prices for 2021 to 2023
- mandated LRET targets for 2018 to 2023
- the Renewable Power Percentage (RPP) as published by the CER for 2018
- estimated RPP values for 2019 to 2023
- the binding Small-scale Technology Percentage (STP) for 2018 under the SRES as published by the CER
- non-binding STP values for 2019 and 2020 and ACIL Allen's projected values for 2021 to 2023
- CER's fixed clearing house price for 2018 to 2023 for Small-scale Technology Certificates (STCs) of $40/MWh.

16.4.7 NSW Energy Savings Scheme

The NSW ESS places an obligation on electricity retailers to obtain and surrender Energy Savings Certificates (ESC), which represent energy savings. Liability under the scheme is set with as a legislated fixed percentage of electricity sales for which ESCs need to be surrendered in each calendar year. ACIL Allen estimated the certificate cost based on the price and volumes traded in the forward market for these certificates. Going forward it is assumed that the cost of purchasing certificates under the scheme will remain constant in real terms.

16.4.8 Other electricity cost

Market fees and ancillary service costs are estimated based on data and policy documents published by the Australian Energy Market Operator (AEMO).

Prudential costs, both AEMO and representing capital used to meet prudential requirements to support hedging taking into account:

- the AEMO assessed maximum credit limit (MCL)
- the future risk-weighted pool price
- participant specific risk adjustment factors
- AEMO published volatility factors
- futures market prudential obligation factors, including:
    - the price scanning range (PSR)
    - the intra month spread charge
    - the spot isolation rate.

16.4.9 Energy losses

The estimated electricity costs resulting from the methodology described above are referenced to the New South Wales Regional Reference Node (RRN). These estimates were then adjusted for transmission and distribution losses. Distribution Loss Factors (DLF) for the Essential Energy zone and electricity consumption weighted average Marginal Loss Factors (MLF) for transmission

losses for the Red Cliffs and Broken Hill connection points[41], were applied to the wholesale electricity cost estimates to incorporate losses.

The MLFs and DLFs used in the calculations were based on the final 2018-19 MLFs and DLFs published by AEMO on 29 March 2018.

16.4.10 Network costs

Australian electricity networks, whether transmission or distribution, are considered to be natural monopolies and, as such, are subject to economic regulation by the AER.

Given its location in regional New South Wales, the pipeline is located within Transgrid's transmission network and Essential Energy's distribution network.

In early April 2018, Essential Energy submitted an annual pricing proposal to the AER for the period 1 July 2018 to 30 June 2019, pending a decision by the AER (at the time of writing the ACIL Allen report). For the purposes of this analysis ACIL Allen assumed that the AER will accept Essential Energy's pricing proposal as submitted.

The Essential Energy tariffs categories are specified in the Essential Energy Pricing Proposal and the Annual Pricing Proposals.[42] Two tariffs classes were relevant for the analysis. The high voltage time of use average daily demand tariff (tariff code: BNS1AO) or the high voltage time of use monthly demand tariff (tariff code: BHND3AO).

ACIL Allen assumed that the pipeline will be treated as four individual customers, one for each pumping station and that each customer will be assigned to the high voltage time of use average daily demand, BNS1AO.

It might be expected that the pipeline would have a seasonable demand and therefore be eligible for HV time of use monthly demand) tariff, BHND3AO. However, the projections provided call this into question. The remaining issue is to project the existing tariffs forward.

In time, Essential Energy will make a regulatory submission to the AER for revenue to be earned beyond 1 July 2019. The revenue the AER ultimately determines to be appropriate will be recovered through new tariffs. Those tariffs are likely to reflect the current tariffs, but changes are possible.

Further, the existing revenue determination remains subject to appeal. If the appeal is resolved in favour of Essential Energy and other NSW network businesses, there is the possibility that future tariffs will be used to recover 'shortfalls' in the revenue earned before July 2019.

As the appeal has not been resolved, and Essential Energy has not yet submitted its regulatory proposal, an assumption must be made as to the future revenue path.

ACIL Allen explored the possibility of using past changes as a guide to the future. However, the past has been characterised by very large changes in Essential Energy's revenue allowance. Therefore, the past is not a useful guide in this situation.

ACIL Allen made the assumption that future network tariffs will grow in line with inflation or, in other words, that they remain constant in real terms over the projection period to 2022-23.

The exception was the Climate Change Fund levy where ACIL Allen observed a declining trend in the past five years. That trend was projected forward.

[41] This point is proximate to Wentworth

[42] https://www.aer.gov.au/system/files/AER%20approved%20-%20Essential%20Energy%202017-18%20Annual%20Pricing%20Proposal%20-%20Prices%20Report%20-%205%20May%202017.pdf

16.4.11 Retail margin

The retail margin compensates electricity retailers for the cost associated with running their retail operations and for the risks they take in supplying customers with electricity.

ACIL Allen analysis of the AEMC's 2017 Residential Price Trends report suggests a retail margin of 7.62 per cent between 2016-17 and 2019-20 in New South Wales.

However, for the pipeline, ACIL Allen has reduced the retail margin estimate by 25 per cent from 7.62 per cent to 5.7 per cent reflecting the larger load of the pipeline.

16.5 Corporate Overhead

Corporate overhead has been calculated by applying a 10% overhead rate to total operating expenditure (excluding the overhead component). The results are shown in Table 31 below.

Table 31 SPV overhead

SPV Overhead (2018-2019 $)						
$'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
SPV overhead	475.4	463.7	437.0	455.1	1,831.2	457.8

This section describes WaterNSW's overhead methodology as it is applied to the SPV.

The creation of the SPV financially separates the pipeline assets from WaterNSW's regulated and non-regulated businesses and assets.

WaterNSW has employed this corporate structure to safeguard WaterNSW's regulated and non-regulated customers from cross-subsidising its pipeline customers (either intentionally or unintentionally)

The management function of the SPV (including shared services) is essentially entirely outsourced to WaterNSW. The services are required for the management and good governance of the SPV, and include:

- corporate risk management
- corporate governance including Executive/Board oversite
- economic regulation
- legal
- shared services
- human resources
- billing
- customer service
- management accounting and reporting
- supporting infrastructure such as property and IT support
- due diligence

- funding
- payroll
- planning.

For these services, WaterNSW proposes to levy a 10% service fee on total recurrent expenditure of the SPV.

WaterNSW considered alternative approaches in devising an overhead rate, such as through a full cost allocation methodology commonly used by monopoly providers. However, given the stand alone nature of the asset a full cost allocation was not seen as appropriate.

The proposed service fee has been set to reflect a benchmark (i.e. market) charge in providing management and shared services to a client. That is, the prudent and efficient costs of management for the required service.

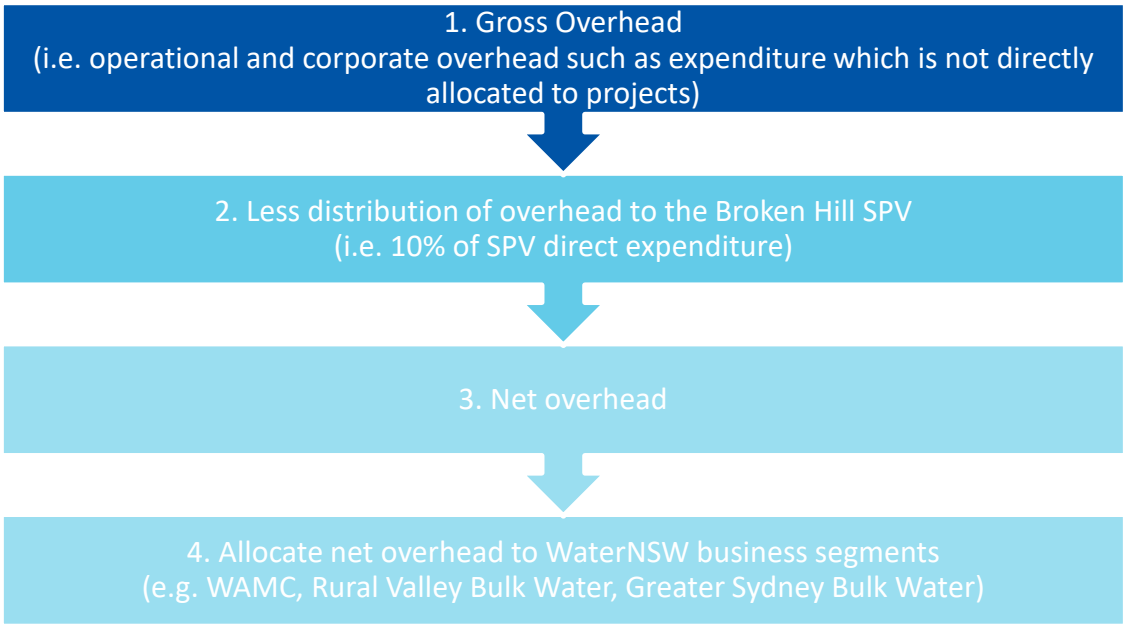
This approach has multiple benefits:

- the arrangement (as opposed to the cost) of using a benchmark service fee as the overhead rate is considered efficient
- the arrangement reflects an 'arm's length' transaction between a service provider and the client in procuring management and corporate services
- the benchmark fee would incentivise the regulated entity to 'beat' the benchmark. This incentive may not exist under a fully costed allocation methodology, where overhead is assumed to reflect actual or realised costs (with the regulator's assessment limited to the step change in prior expenditure into the forecast period)
- the SPV would attract a lower overhead rate under a benchmark service fee rather than under the fully absorbed overhead methodology
- the approach is consistent with the corporate structure of the SPV and the decision to structurally separate the pipeline assets from WaterNSW. The approach is clear and transparent to our various customer groups
- the overall cost outcome does not seem unreasonable when you consider the size of the assets and the commercial oversight required to ensure the SPV is meeting customer expectations and contractual obligations.

No part of the service fee includes a profit margin to compensate WaterNSW for required return on equity or debt. Capital costs are compensated through the WACC and will be recovered through prices under the building blocks approach.

The overhead allocated to the SPV will not be allocated to any other business segment of WaterNSW, as highlighted in Figure 13 below.

Figure 13 Overhead allocation flowchart



The allocation process starts with gross overhead, which includes the following:

- **Operational overheads:** which include business units costs which cannot be directly attributed to projects or assets (i.e. Shared services overhead - Legal Services, Finance and Commercial Services, Information and Communications Technology)

- **Corporate overhead:** which refers to service business unit costs such as Chief Executive, Corporate Systems, Regulatory Strategy, People, Capability and Transformation.

A share of the gross overhead is then apportioned to the SPV using an overhead rate of 10% applied to total recurrent expenditure of the SPV. The balance of the overhead (net overhead) is then apportioned across the business segments, such as determination specific (rural valley, Greater Sydney, WAMC) and other non-core special projects.

16.6 Other operating expenses

The SPV will incur other operational expenses necessarily incurred in the running of the pipeline, including contract management, financial governance and audit and insurance.

The SPV is expected to incur financial governance and audit costs of approximately $100k per annum as part of its reporting obligations under the *Annual Report (Statutory Bodies) Act 1984*, the SOC Act, the *Government Sector Employment Act 2013,* the *Public Finance and Audit Act 1983* and the *Public Finance and Audit Regulation 2010*.

The SPV will utilise WaterNSW's current insurance cover with iCare for its infrastructure and property assets, with an estimated premium of around $120k per annum for the pipeline. The insurance will cover property, public liability, directors and officers liability and statutory liability. The SPV is also expected to incur land tax payable on the land owned by the SPV, calculated on 2% of the value of the land.

There will also be 1.5 FTEs employed by WaterNSW who will manage the O&M contract on behalf of the SPV, ensuring compliance by the contractor of the requirements of the O&M contract. This represents a total costs of $220k per annum (18-19$) for each year of the determination period.

The other operating expenses are itemised in Table 32 Operating Expenditure by Category below.

Table 32 Operating Expenditure by Category

Total Operating Expenditure by category (2018-2019 $)						
$'000	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**Total**	**Average**
SPV audit costs	100.0	100.0	100.0	100.0	400.0	100.0
SPV contract management costs	220.0	220.0	220.0	220.0	880.0	220.0
Insurance and land tax	131.4	131.4	131.4	131.4	525.7	131.4

17. Prices

17.1 Introduction

Section 15 of the IPART Act, requires IPART to have regard to a number of matters in making its pricing determinations:

- protecting consumers from unreasonable price increases or inefficient practices
- ensuring monopoly service providers earn a fair rate of return on prudent and efficient investments
- encouraging regulated service providers to improve their economic efficiency and maintain or improve their service quality
- encouraging competition where possible
- ensuring that regulated service providers remain financially viable
- maintaining ecologically sustainable development and protection of the environment.

WaterNSW has considered the principles prescribed in section 15 (where relevant) in developing its proposed charges for Essential Water and offtake customers.

WaterNSW has proposed a cost reflective charging structure for the pipeline to promote the economically efficient use of the pipeline and to minimise financial risk to WaterNSW. This is discussed in the analysis in section 17.3.2 and 17.3.3.

Individual charges have been apportioned to Essential Water and offtake customers by reference to the service standards provided to the pipeline customers, the contribution each customer makes in creating the cost and their requirements for the pipeline.

Much of the cost of the pipeline will be passed onto Essential Water, for whom the pipeline has been constructed, in line with the principles described above. The charges to Essential Water will include:

- fixed electricity charge
- electricity demand charge, which applies at all times when the pipeline is activated to facilitate a water order for Essential Water
- fixed operational and maintenance charge.
- shutdown, restart, and standby charges (where relevant)
- a variable (electricity) charge per ML of water ordered or delivered, which varies by weekly demand
- the WaterNSW fixed charge to recover cost of capital and other internal and external costs incurred by WaterNSW in complying with the Pipeline Direction
- variable charge for the provision of Early Water Services.

Offtake customers will contribute to a lower cost of supply as the supply arrangements between WaterNSW and Essential Water preference the delivery requirements of Essential Water instead of offtake customers. Offtake customers will contribute to the:

- incremental cost of the offtakes, such as the cost of capital and a small contribution to the cost of the pipeline, which would be recovered via a WaterNSW fixed charge

- variable electricity costs, which would be recovered via a variable charge per ML of water ordered/delivered.

The extent to which Essential Water's end users should contribute to the cost of the pipeline is a matter to be decided by IPART under the Essential Water Determination, in consultation with customers, Essential Water and the NSW Government. WaterNSW's anticipates that Essential Water would seek additional funding from Government to offset some or all of the cost of the pipeline.

17.2 Proposed charges

The proposed charges are listed in Table 33 to Table 38 below.

Table 33 Charges to Essential Water per annum

Fixed Charges to Essential Water (18-19$)					
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**%Δ 19-20 to 22-23**
WaterNSW fixed charge (per annum)	$27,021.11	$26,814.78	$26,570.24	$26,373.56	-2.4%
Fixed operational and maintenance charge (per annum)	$1,595.96	$1,598.33	$1,587.10	$1,585.28	-0.7%
Fixed electricity charge (per annum)	$28.66	$28.65	$28.66	$28.65	0.0%

* Fixed Charge, levied irrespective of water take. A rebate will be applied to the fixed operational and maintenance charge and paid to Essential Water while the pipeline is in shutdown/standby mode, in proportion to the number of days the pipeline is in shutdown/standby mode.

Table 34 Charges to Essential Water per annum

Maximum Demand Charges to Essential Water (18-19$)					
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**%Δ 19-20 to 22-23**
Electricity demand charge (per month)	$68.40	$68.40	$68.40	$68.40	0.0%
Electricity demand charge (per annum)	$820.80	$820.78	$820.79	$820.83	0.0%

* The charge is expressed as a monthly and per annum charge. Demand charges apply at all times once pipeline is activated to facilitate a water order for Essential Water. Charges have been expressed as a monthly charge and per annum charge. The per annum charges assumes the pipeline is activated for the entire year. The monthly charge is levied for each month the pipeline is activated (regardless of whether or not the pipeline is activated for the entire month to facilitate a water order).

Table 35 Variable Charge to Essential Water ($ per ML)

Variable Charge to Essential Water (18-19$)				
By weekly demand	**19-20**	**20-21**	**21-22**	**22-23**
1 ML to 10 ML	$2,000.13	$1,863.48	$1,580.86	$1,831.71
11 ML to 20 ML	$808.58	$752.79	$636.70	$726.52
21 ML to 30 ML	$586.25	$545.55	$460.54	$520.33
31 ML to 40 ML	$488.88	$454.78	$383.38	$430.00
41 ML to 50 ML	$434.42	$404.01	$340.23	$379.49
51 ML to 60 ML	$399.76	$371.71	$312.77	$347.36
61 ML to 70 ML	$375.47	$349.07	$293.52	$324.83
71 ML to 80 ML	$357.75	$332.55	$279.48	$308.39
81 ML to 90 ML	$344.26	$319.97	$268.79	$295.88
91 ML to 100 ML	$333.29	$309.75	$260.10	$285.70
101 ML to 110 ML	$324.78	$301.84	$253.43	$278.24
111 ML to 120 ML	$321.27	$298.73	$251.38	$279.48
121 ML to 130 ML	$318.09	$295.91	$249.49	$280.33
131 ML to 140 ML	$315.51	$293.62	$247.97	$281.14
141 ML to 150 ML	$313.03	$291.42	$246.47	$281.63
151 ML to 160 ML	$311.35	$289.94	$245.54	$282.51
161 ML to 170 ML	$309.68	$288.48	$244.59	$283.10
171 ML to 180 ML	$308.25	$287.23	$243.82	$283.67
181 ML to 190 ML	$307.31	$286.43	$243.39	$284.42
191 ML to 280 ML	$306.51	$285.71	$242.87	$284.29

*Variable Charge, levied on per ML of water. It is levied based on water taken at the relevant metering point. Variables charges are expressed in weekly demand ‘bands’. For example, if Essential Water orders 61MLs in the week, WaterNSW will levy $375.47 per mL for the water taken for the week.

Table 36 shutdown, standby and restart charges to Essential Water

Shutdown or standby charges (18-19$)			
	Temporary (Less than 30 days)	**Short Term (30 to 90 days)**	**Long Term (Greater than 90 days)**
Shutdown Payment (per shutdown event)	$1,142.66	$2,302.03	$11,962.43
Restart Payment (per restart event)	$571.33	$1,151.02	$10,222.32
Standby Payment (per day)	$4,241.63	$4,149.72	$4,056.76

* Shutdown charge is levied per shutdown event. Restart charge is levied per restart event. Standby charges are levied for each day the pipeline is in shutdown/standby mode, the period between Shutdown and Restart. To ensure the fixed operational maintenance charge is not levied while the pipeline is in shutdown/standby, a 'rebate' on the annual fixed operational maintenance charges (minus the asset replacement costs), will be paid to Essential Water, which is prorated based on the number of days in which the pipeline is in shutdown/standby mode. Expenditure under the contract is expressed in real $ as at March 2017. Shutdown and standby charges have been inflated using actual ABS March 2017- to March 2018 inflation of 1.9% and forecast March 2018 – to March 2019 inflation of 2.5% as specified by IPART. Note that the contract requires the shutdown, restart and standby payments to be inflated by a weighting of 29.46 per cent by WPI and 70.54 per cent by CPI however the expenditure in this table has been inflated using CPI for simplicity due to the late release of the WPI figures and the timeline for preparation of this pricing submission. WaterNSW will provide updated (indexed) charges for shutdown, restart and standby payments during the price review process with actual CPI and WPI for the period March 2017 to March 2018 and March 2018 to March 2019.

Table 37 Early water service charges to Essential Water

Variable Charge for Early Water Services (nominal$)	
	$ per ML
Variable Charge	$411.68 per ML

*Variable Charge, levied on per ML of water taken during the provision of Early Water Services, or water supply after the 'Ready for Water' date (i.e water which is delivered before the asset is commissioned). It is levied based on water taken at the relevant metering supply point.

Table 38 Charges to offtake customers per offtake outlet

Charges to Offtake Customers (18-19$)					
	19-20	**20-21**	**21-22**	**22-23**	**%Δ 19-20 to 22-23**
Offtakes fixed charge (per annum)	$9,958.07	$9,862.23	$10,022.27	$9,435.50	-5.2%
Variable Charge (per kL) *	$0.32	$0.30	$0.25	$0.28	-13.0%
Variable Charge (per ML) *	$321.27	$298.73	$251.38	$279.48	-13.0%

*The charge is expressed in kL and ML. Variable charge rate is the same. The fixed charge will be levied irrespective of water take. Price is levied for each offtake outlet.

17.3 Charging structure

Charging structure refers to the type and combination of fixed or variable charges used to recover the prudent and efficient costs of providing pipeline services.

Under WaterNSW's proposal:

- costs under the O&M contract would be recovered via charges, which closely align with the cost structure of the O&M contract

- cost of capital and other fixed and internal cost incurred by WaterNSW in complying with the Pipeline Direction and Construction Direction, would be recovered from Essential Water via a fixed charge, aligning with WaterNSW's predominately fixed cost base

- cost of capital incurred by WaterNSW in constructing and installing the offtake assets, along with a small cost contribution to the pipeline asset, would be recovered from offtake customers (per offtake outlet) via a fixed charge.

The next few sections describe WaterNSW considerations in proposing a charging structure to recover the costs of the O&M contract.

17.3.1 Costs under the O&M contract

The costs under the O&M contract capture the following charge categories to recover the operational costs of the pipeline:

- Operational and maintenance fixed charge

- Asset replacement charge

- Fixed electricity charge

- Variable electricity charges

- Electricity demand charge

- Standby, Shutdown and restart charges

- Early water variable charge.

WaterNSW considered the following options in devising a charging structure to recover the cost of the pipeline:

- back to back charging structure with the O&M contract, that is, the cost formulas in the O&M would be replicated in an IPART determination

- simplified charging structure, with one fixed charge and one variable charge.

A charging structure which is back to back with the O&M contract was:

- considered problematic in replicating the variable electricity charges, as they could not be applied in a way that the customer could directly work out the price they would be charged

- considered viable for replicating the fixed charges, as they could easily be replicated under an IPART determination.

For fixed charges, WaterNSW has decided to replicate the fixed charges in the O&M contract. The calculations for the fixed charges are discussed in section 17.8 and 17.12.

For the variable electricity charges, WaterNSW observed that:

- the variable electricity charges under the O&M contract are calculated using the total volume extracted by all customers (i.e. Essential Water and offtake customers combined)

- Essential Water cannot predict the usage patterns of the offtake customers' and neither can the offtake customers predict the usage patterns of Essential Water in any given week; hence

- the variable electricity charge for an offtake customer may vary significantly depending on the volume of water used by Essential Water in the relevant week.

Therefore, it was concluded that IPART would be unable to 'determine' or 'approve' a regulated charge in relation to the variable electricity charges in the O&M contract.

The next sections consider the method of setting the variable charge structure to recover the cost of electricity for the pipeline.

17.3.2 Simplified tariff structure

A simplified charging structure, with one variable charge, was found to deviate from the cost structure in the O&M contract, imposing unnecessary financial risk on WaterNSW.

Under the O&M contract, the charge rate for electricity rises as weekly demand declines. In particular, the charge rate varies significantly when weekly demand is anywhere between 1 ML and 90 MLs, as shown in Table 39 below.

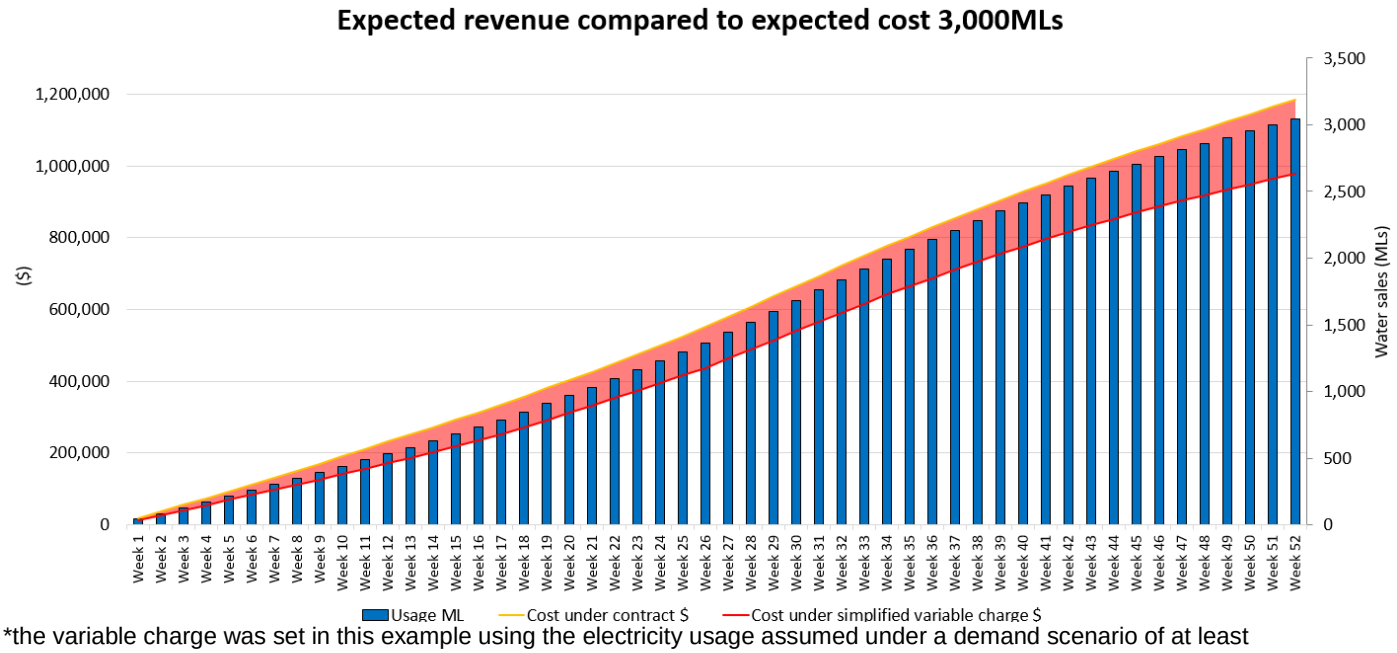
Table 39 Difference in variable charge between charge bands

Usage	Variable Charge 19-20	Difference from prior usage band
By week	**$ per ML**	**%**
1 ML to 10 ML	$2,000.13	n.a
11 ML to 20 ML	$808.58	-59.57%
21 ML to 30 ML	$586.25	-27.50%
31 ML to 40 ML	$488.88	-16.61%
41 ML to 50 ML	$434.42	-11.14%
51 ML to 60 ML	$399.76	-7.98%
61 ML to 70 ML	$375.47	-6.08%
71 ML to 80 ML	$357.75	-4.72%
81 ML to 90 ML	$344.26	-3.77%

This variation in cost cannot easily be replicated under a simplified tariff. The revenue gap between actual costs and expected revenue is expected to widen even further when the pipeline is under-utilised.

The chart below shows the revenue shortfall risk to WaterNSW (red shaded area) using a simplified charging structure under a water take scenario of 3,000 MLs compared to the costs incurred under the O&M contract.

Figure 14 Expected revenue to expected costs - 3,000MLs



*the variable charge was set in this example using the electricity usage assumed under a demand scenario of at least 111MLs per week.

A simplified tariff structure for the pipeline would shield the customer from the true costs of the pipeline, particularly when the asset is being under-utilised. For instance, EW would not be exposed to the true cost of delivering the water via the pipeline asset under a scenario of reduced demand. This is not in the best interest of the residents of Broken Hill or the NSW taxpayer. On the other hand, the variable charge structure contained within the O&M contract does provide some incentive for the user to improve the utilisation of the asset, as discussed below.

17.3.3 WaterNSW's proposal on tariff structure.

A charge structure where the charge rate for electricity rises as weekly demand declines (as per the O&M contract), could, if implemented incentivise the user to use the pipeline asset more frequently. If for example:

- Essential Water orders 20MLs of water every week or approximately 1,000MLs per annum at a variable charge rate of $808,58 per ML, then

- Essential Water would be incentivised to order an additional 400 MLs of water (1,400MLs or 40% additional water) for the same price under a reduced variable charge rate of $586.25 per ML within the next weekly supply band of 21MLs to 30MLs.

It is regulatory best practice for pricing regulators to set cost reflective tariffs. That is, fixed charges should recover fixed costs and variable charges should recover variable costs. A cost reflective charging structure can promote the economically efficient use of water infrastructure assets by sending the appropriate price signal users, in this case, the increased charge rate for electricity as the pipeline is being under-utilised.

WaterNSW believes that it is desirable for IPART to implement a charging structure which encourages Essential Water to use the pipeline asset as much as possible.

To achieve this end, WaterNSW proposes to adopt the methodology used in the contract to calculate the variable electricity charges, with minor variations to the formula to resolve the issues which were identified in section 17.3.1.

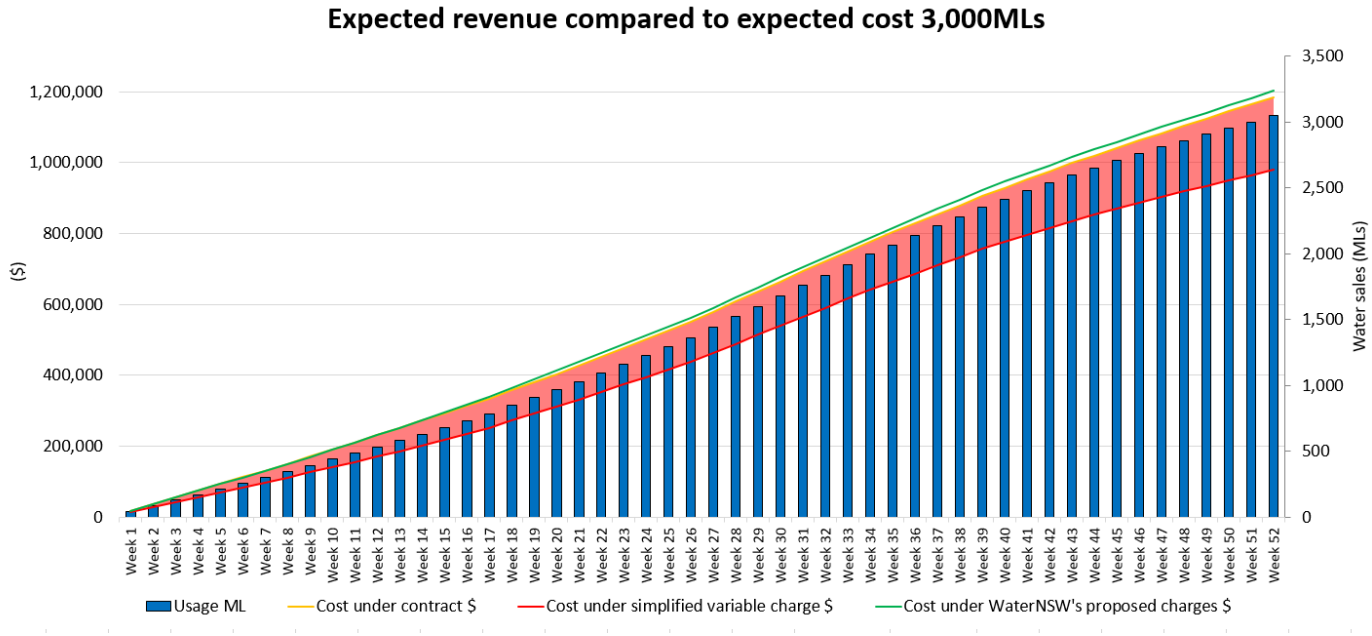
The minor amendments would allow customers (i.e. Essential Water and offtake customers) to directly work out the price they would be charged in respect of the variable charges. This is

achieved by having a separate electricity volumes table for both offtake customers and Essential Water, which are used to compute separate variable charges for both offtake customers and Essential Water. The Essential Water variable charge would vary by weekly demand as per the O&M contract, while the variable charge for offtake customers would not vary by weekly demand.

These amendments are outlined in Attachment D of this proposal in greater detail. The inputs and formula used to compute the variable charges are discussed further in section 17.10.

The chart below shows the expected revenue under WaterNSW's proposed charging structure (in green), against the cost structure in the contract (in yellow), and the simplified charging structure (in red). Under WaterNSW's proposal, the proposed charging structure (green) closely aligns with the cost structure in the contract (yellow).

Figure 15 Expected revenue to expected costs - 3,000MLs with proposed charging structure



17.3.4 WaterNSW's fixed charge for its cost of capital and other costs

WaterNSW believes it is appropriate to levy on Essential Water a fixed charge to recover its cost of capital for the pipeline and other fixed internal and external costs incurred by WaterNSW in complying with the Pipeline Direction and the Construction Direction. These costs are fixed in nature and hence it is appropriate to recover them via a fixed charge.

Similarly, for offtake customers, it is also appropriate to levy a fixed charge on offtake customers to recover its cost of capital for constructing and installing the offtakes on the pipeline, along with a small contribution to the pipeline. This is discussed further in section 17.5.

17.4 Allocation of charges to the pipeline customers

Based on the charging structure proposed above, it is necessary to apportion the charges to each pipeline customer (i.e Essential Water or the offtake customers).

It is considered appropriate to apportion the charges to customer groups based the contribution that each customer makes in creating the cost and their requirements for the pipeline (such as service standards).

WaterNSW found that most of the pipeline charges should be levied on Essential Water, as WaterNSW has necessarily incurred capital and operating costs to build and maintain the pipeline for Essential Water. Essential Water's primary role is to provide drinking water to the residents of

Broken Hill. The pipeline has been constructed for Essential Water to achieve this objective. WaterNSW's analysis is found in Table 40 below.

Table 40 Charges by Customer

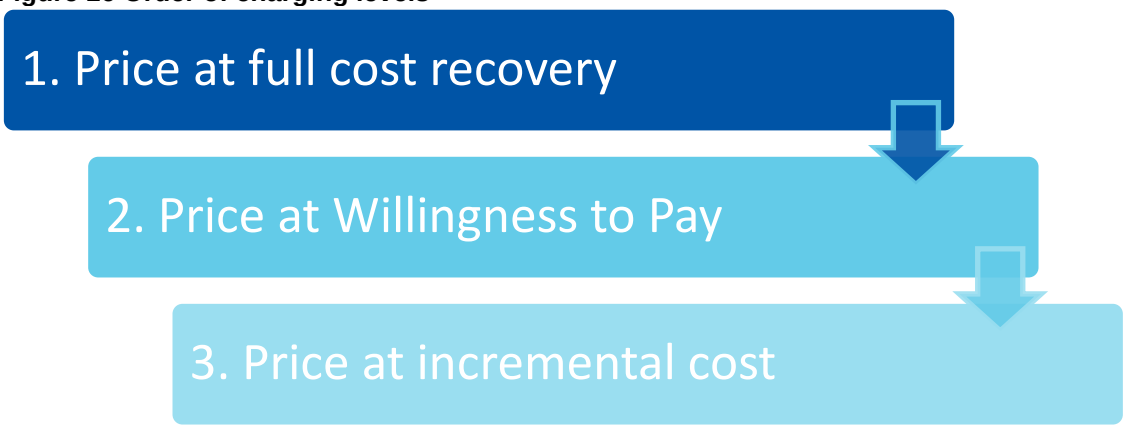
Charge	Customer	Comment
WaterNSW Fixed Charge	Essential Water	This is the base charge which recovers the cost of capital as well as the fixed internal/external costs incurred by WaterNSW in complying with the Pipeline Direction and the Construction Direction (i.e. to arrange for the construction, operation and maintenance of the pipeline). This charge should be paid for by Essential Water, for whom the pipeline is constructed. The primary role of the pipeline is to provide water to the residents of Broken Hill. Further, the supply arrangements for the pipeline preference demand from the Broken Hill township over other customers. Demand from the offtake customers is incidental to the supply arrangements of the pipeline and not the primary driver. Note that this amount excludes a small contribution to the costs of the pipeline by offtake customers as determined through the offtake customer's willginenss to pay.
Fixed operational and maintenance charge	Essential Water	This charge recovers the fixed cost of operating and maintaining the pipeline. The Pipeline Direction requires WaterNSW to arrange for the construction, operation and maintenance of the pipeline. It is noted that the incremental costs of maintaining the offtakes is not separately itemised under the O&M contract. Regardless the installation of the 3 offtakes is not likely to increase the basic work load required to maintain the pipeline asset. As such, this charge should be paid for by Essential Water, as the fixed operational and maintenance costs have been triggered based on the needs of Essential Water. Essential Water's primary role is to provide drinking water to the residents of Broken Hill. The pipeline has been constructed for Essential Water to achieve this objective.
Electricity demand charge	Essential Water	This is a flat variable charge which is levied at all times when the pipeline is activated in order to facilitate a water order for Essential Water. That is, the charge is the same regardless of whether 1ML or 280MLs or water is delivered in any given week. It is a charge which recovers the cost of 'turning on' the pipeline. The pipeline will operate under preferential water supply arrangements with Essential Water. That is, Essential Water would call the pipeline into operation, offtake customers cannot call the pipeline into operation. Hence Essential Water should pay for this charge.

Charge	Customer	Comment
Fixed electricity charge	Essential Water	The fixed electricity charge varies depending on the number of electricity meters and network access points. The installation of the offtakes has not created additional costs which are recovered via the fixed electricity charge (i.e. has not created the need for further electricity meters or network access points). Therefore, offtake customers have not 'created' the cost. The number of electricity meters and network access points is driven by the design of the main pipeline. Hence Essential Water, for whom the pipeline has been constructed, should pay for this charge.
Offtakes fixed charge	Offtake customers (levied on a per offtake outlet basis)	This charge represents the incremental cost of constructing and installing the offtakes along the pipeline, along with a small contribution to the cost and maintenance of the pipeline, which is determined by the customer's willingness to pay. See section 17.5. The incremental cost of the offtakes will be incurred only if the offtake customer agrees to the provision of services at the offtake supply points.
Variable Charge	Essential Water/Offtake Customers (levied on a per offtake outlet basis)	This charge recovers the variable cost of electricity. That is the marginal cost of delivering the water through the pipeline. Both Essential Water and offtake customers should contribute to the cost of electricity in proportion to the volume of water that they order.
Shutdown, restart and standby charges	Essential Water	Essential Water will be able to request the pipeline to be placed in shutdown/standby mode, creating the need for the cost to arise.
Early Water Variable Charge	Essential Water	Essential Water can request the provision of Early Water Services (i.e. water which is delivered before the asset is commissioned).

17.5 Offtake customer charges

WaterNSW considered, in the order set out in Figure 16, the optimal charging levels for offtake customers.

Figure 16 Order of charging levels



17.5.1 Full cost recovery

WaterNSW initially considered allocating a proportion of the cost of the pipeline (as well as the cost of the offtakes) to the offtake customers. This was called the "full cost recovery" approach.

WaterNSW estimated full cost recovery to be approximately $80k to 100k per annum per offtake customer using early assumptions and calculations. The $80k to 100k was calculated by reference to:

- the incremental cost of constructing and installing the offtake; plus
- the variable cost of electricity at 10MLs of demand per offtake customer per annum; plus
- some contribution to the capital cost of the pipeline determined by applying:
    - a ratio of offtake demand to total demand from the pipeline; to the
    - revenue requirement for the pipeline asset (pipeline RAB + opex).

$80k to $100k per annum per offtake customer was considered to be out of reach for all potential offtake customers and was not pursued further.

17.5.2 Capacity to Pay analysis based on economic value derived from offtakes

WaterNSW then conducted a CTP analysis based on the potential economic value derived from the offtakes, as a means of setting an efficient charging level for the service.

CTP uses financial analysis to calculate how much customers could afford to pay for the pipeline. WaterNSW based its CTP analysis on the assumption that water from the offtakes will be used to generate income by increasing stock sizes on properties connected to the offtakes, noting that the properties connected to the offtakes are pastural.

WaterNSW did not consider CTP from the perspective of:

- matching the cost of supply arrangements from alternative water sources (such as bores) as it considered the cost to be too subjective to the individual customer
- non-economic stock and domestic uses or other intermittent uses such as for 'drought insurance' or in emergency, as WaterNSW considered it could not offer a charging structure with an extremely high variable component as such arrangements would allocate unnecessary volume risk to WaterNSW.

WaterNSW's analysis relied on information provided by the NSW Department of Industry, Local Land Services (DoI) relating to the on-farm economics of merino wool stock (as this was the more profitable stock option).

This approach determines CTP by calculating affordability against an industry benchmark rate of return (ROR assumed is 8%)[43]. This is shown below:

$$\text{Rate of Return (8\%)} = \frac{Gross\ Margin - Fixed\ Overhead}{Capital\ Investment}$$

Where:

[43] Source: Email from development officer at Local Land Services. Also note ROR of 8.6% observed in 2016 for Sheep-Beef industries: Department of Agriculture and Water Resources. http://apps.daff.gov.au/agsurf/agsurf.asp

- *Gross Margin = DoI published margin of $112 per ewe x number of extra ewes (283)*
- *Fixed Overhead = 20 year depreciation of Capital Investment + Capacity to Pay*
- *Capital Investment = customer infrastructure + customer water entitlement*

For the Gross Margin, the analysis assumed customers could increase their stock by 283 extra ewes. This represents a 15% increase from potential average stocking levels found in properties in the Western Division region according to economic indicators provided by Local Lands Services. The analysis was based on the following:

- information from Local Land Services regarding average stocking levels for properties in the Western Divisions region (on a Dry Sheep Equivalent Basis)
- survey responses from potential customers. One customer responded they could potentially increase their stocking level by over 30%, while two customers said they may be able to increase their stocking level from 0% to 30%.

For the capital investment, the analysis assumed:

- customers would require capital investment in pipes and storage tanks of approximately $50,000 to 100,000 based on survey responses from 2 customers (out of 4 responses), the cost of which has been depreciated over 20 years which is incurred as a fixed overhead by the customer
- the cost of acquiring 1ML of High Security (HS) entitlement from the Murray River is $3,398 per ML based on an Aither market report from 2017.[44] It was assumed only 1ML of entitlement would be acquired as the additional water requirements for 283 merino rams is approximately 4 liters per day per ram (i.e. less than 1ML).[45]

The input assumptions are shown in Table 41 below and the CTP calculations are shown below.

Table 41 Input assumptions

Factor description	Value	Comments
The DSE for the property is computed by multiplying a DSE rating per HA by the size of the property	4,377	Total DSE can be sustained on the property
According to DoI, Merino Rams (Sheep) have a DSE rating of	2.32	DSE's/ewe
The property can stock	1,887	Merino Rams, which is derived by 4,377 Total DSE divided by 2.32 DSE's/ewe
3 customers indicated an increase in stock which has been averaged as a factor of 0.15 which is	283	Additional Merino Rams. 1,887 X 0.15 = 283
According to DoI, each sheep may have a water requirement of 4 litres per day which means 283 merino rams require an additional	0.4132	MLs of water per annum

[44] http://www.aither.com.au/wp-content/uploads/2017/09/17_08_28_AWMR-2016-17_FINAL_STC_comp.pdf
[45] https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/96273/Water-requirements-for-sheep-and-cattle.pdf

Two scenarios were modelled based on an 8% rate of return.

Scenario 1 (8%) = $\frac{(\$112\ X\ 283)-(\$5{,}170+CTP)}{(\$100{,}000+3{,}398)}$ CTP = $18,000

Where the capital investment is $100,000 plus the cost of acquiring a HS entitlement 1ML entitlement ($3,398).

Scenario 2 (8%) = $\frac{(\$112\ X\ 283)-(\$2{,}670+CTP)}{(\$50{,}000+3{,}398)}$ CTP = $25,000

Where the capital investment is $50,000 plus the cost of acquiring a HS entailment 1ML entitlement ($3,398).

The analysis yielded a CTP from between $18,000 to $25,000.

17.5.3 Willingness to Pay – interested parties

As set out in section 6.3.1, through the consultation process with offtake customers, 3 customers indicated that they would be willing to pay up to $14,000 per annum for an offtake (inclusive of the cost of transporting 10ML of water). These customers entered into a letter of intent with respect to the construction of an offtake near their properties.

WaterNSW notes that $14,000 is approximately $2,500 higher than the charging levels at incremental cost recovery, which was calculated as the capital cost of the offtakes using the annuities approach (see section 10.4) plus the variable cost of electricity at 10MLs per annum.

WaterNSW is proposing a price for the offtakes of $13,500 per annum (in nominal terms), which provides some contribution to the cost of the pipeline, being above incremental cost. The contribution is approximately $2,500 per annum on average assuming CPI increases of 2.5% each year. This small contribution will defray some costs from the amounts Essential Water is required to pay to recover the costs of the pipeline.

17.5.4 Comparison with other pipelines

The CTP analysis as well as our proposed charges for offtake customers is compared to the price of other comparable pipelines as set out in Table 42 Comparison of piped supply schemes.

Table 42 Comparison of piped supply schemes

Piped supply scheme	Fixed charge (per annum)	Variable charge (per ML)	Bill under 10 ML usage	Comment
Victorian Mallee pipeline GWM water (Horsham Vic)[46]	$7,547	$1,757	$25,121	80mm - treated water
Rural Pipeline System – GWM[47]	$8,966	$1,031	$19,272	Untreated water
Essential Water Menindee Pipeline[48]	$5,243	$780	$13,043	Non-residential untreated water customers
SA Water Murray pipeline(s)[49]	$292	$3,308	$33,372	Non-residential customers
WaterNSW Greater Sydney (unfiltered minor customers) [50]	$1,721	$1,230	$14,021	80mm pipe
WaterNSW Fish River Scheme (raw water minor customers)[51]	$4,000	$642**	$10,420	Raw water minor customer
Offtake customers - incremental cost recovery	$7,415	$326	$10,673	HS Customer*
CTP analysis			$25,150	HS Customer*
Offtake outlets - WaterNSW's proposal			$13,500**	

* Assumes customers hold 10MLs of HS entitlements in the Murray Valley **(the cost of which is not included in the figures for WaterNSW's proposal of $13,500).
** represents the weighted average variable charge for a raw water customer using 10ML of demand. Note that the variable charge of $250 per ML is levied on 0.2MLs of water, a variable charge of $650 per ML is levied on 9.8 MLs of water.

The charges proposed in this submission for offtake customers compare favorably to the CTP analysis and the prices of other comparable pipelines.

17.6 Proposed prices under shutdown or standby

WaterNSW can request from the pipeline operator a cessation of the operation of the pipeline, at Essential Water's request, under certain conditions to be negotiated under the raw water supply agreement. Additional costs for placing the pipeline in shutdown mode are incurred under the O&M contract.

WaterNSW proposes to levy on Essential Water the following shutdown, restart and standby payments, depending on the length of time the pipeline is placed in shutdown mode. These charges are listed in Table 43 Shutdown and standby charges.

[46] http://gwmwater.org.au/component/edocman/1315-schedule-of-tariffs-miscellaneous-and-other-charges-2017-18/download
[47] http://www.gwmwater.org.au/component/edocman/593-rural-pipeline-products-and-charges/download
[48] http://www.essentialwater.com.au/asset/cms/pdf/2017EssentialWaterCharges.pdf
[49] https://www.sawater.com.au/accounts-and-billing/current-water-and-sewerage-rates/non-residential-water-supply
[50] https://www.waternsw.com.au/customer-service/ordering-trading-and-pricing/pricing/water-pricing
[51] Ibid

Table 43 Shutdown and standby charges

Shutdown or standby charges (18-19$)			
Charge Category	**Temporary (Less than 30 days)**	**Short Term (30 to 90 days)**	**Long Term (Greater than 90 days)**
Shutdown Payment (per shutdown event)	$1,142.66	$2,302.03	$11,962.43
Restart Payment (per event)	$571.33	$1,151.02	$10,222.32
Standby Payment (per day)	$4,241.63	$4,149.72	$4,056.76

The Shutdown and Restart Payments are payable for each shutdown or restart event. The Standby Payment will be levied per day varying depending on the length (in days) of the shutdown.

If the pipeline enters shutdown mode, WaterNSW will reimburse Essential Water a proportion of the fixed operational maintenance charges based on the number days the pipeline was in shutdown mode. The 'rebate' on the annual fixed operational maintenance charges (minus the asset replacement costs), will be prorated based on the number of days in which the pipeline is in shutdown mode. The formula for the rebate is shown below:

$$\frac{Total\ shutdown\ days\ for\ the\ year}{Total\ days\ for\ the\ year} \times (Fixed\ Operational\ and\ Maintenance\ Charge - Asset\ Replacement\ Cost)$$

The fixed operational and maintenance charge can be found in Table 33. The asset replacement costs represent a nominal amount which is found in Table 29.

For example, if the pipeline is called into shutdown mode for 30 days in 2020-21, then the rebate would be calculated as follows:

$$\frac{30}{365} \times (1{,}598.33 - 1.138) = \$131.28$$

17.7 Proposed prices under Early Water Services

Section 7.8.2 above describes the concept of Early Water Services, which would be provided to Essential Water prior to completion and commissioning of the pipeline if other water sources were no longer available to supply water to the Broken Hill township after December 2018.

The Early Water Service charge is shown below in Table 44. The charge equals the charge to WaterNSW in the O&M contract.

Table 44 Early water service charge to Essential Water

Variable Charge for Early Water Services (nominal$)	
	$ per ML
Variable Charge	411.68 per ML

Section 8.2 above describes how we propose to deal with charging Essential Water for services supplied prior to IPART's final determination of prices.

17.8 Fixed operational and maintenance charge

The fixed operational and maintenance charge includes the fixed cost of the pipeline operator and a minor cost component for asset replacement.[52] The charge applies only to Essential Water.

[52] The fixed costs are set out in table A1.1 of Attachment 1 of the O&M contract (as a monthly charge). Asset replacement costs can be found in table A1.4 of attachment 1 of the O&M contract (as a quarterly charge).

The fixed costs have been inflated to 18-19$ and converted to annual charges for the purposes of this submission.

Table 45 Fixed operational and maintenance charge

Fixed operational maintenance charge (18-19$)					
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**%Δ19-20 to 22-23**
Fixed operational and maintenance charge	$1,595.96	$1,598.33	$1,587.10	$1,585.28	-0.7%

17.9 Electricity demand charge

The formula for the electricity demand charge is:

> *Monthly electricity demand charge = Peak Demand Charge (Cents per KVA) X Peak Maximum Demand (kWh per mL) + Shoulder Demand Charge (Cents per KVA) X Shoulder Maximum Demand (kWh per mL) + Off-peak Demand Charge (Cents per KVA) X Off-peak Maximum Demand (kWh per mL), where the inputs are shown below for each year of the 2019-23 regulatory period:*

Table 46 Inputs for the electricity demand charge

Rate	Unit	19-20	20-21	21-22	22-23
Peak Demand Charge	Cents per KVA	896.585	896.609	897.027	896.891
Shoulder Demand Charge	Cents per KVA	811.707	811.898	811.596	811.732
Off-peak Demand Charge	Cents per KVA	244.878	244.616	244.222	244.607
Peak Maximum Demand	Maximum Variable Electricity Demand (kVA)	3,502	3,502	3,502	3,502
Shoulder Maximum Demand	Maximum Variable Electricity Demand (kVA)	3,502	3,502	3,502	3,502
Off-peak Maximum Demand	Maximum Variable Electricity Demand (kVA)	3,502	3,502	3,502	3,502

The Peak, Shoulder and Off-peak demand charges have been sourced from ACIL Allen's advice on forecast electricity costs for the 2019-23 period. Although retail electricity rates have been sourced from the market via [redacted] the network charges (including the network demand charges) are expected to be treated as a pass through cost under the PSA.

Therefore, it is proposed that IPART implement an annual review mechanism to revise the cost inputs for the electricity demand charge, electricity variable charges and fixed electricity charges, with actual electricity tariffs, rather than relying on the ACIL Allen forecast prices.

This will ensure that future price reductions are passed on to customers as soon as they are realised. Further, WaterNSW proposes to share the efficiencies which are available under the O&M contract with Essential Energy. This can only occur if actual electricity tariffs are used in the determined prices. This is discussed further in section 17.14.

It is proposed that the network demand charge for each subsequent regulatory year would be determined under the annual review process (discussed in section 17.13). It is noted that actual network demand tariffs and other ancillary charges are reviewed and approved annually by the AER in accordance with Part 1, Rule 6.18 of the National Electricity Rules (NER). WaterNSW submits that IPART will be able to rely on the decision on another regulator, in passing on the

prudent and efficient costs of network electricity tariffs and other ancillary charges under an IPART determination. [53]

The calculation for the electricity demand charge is shown below.

Table 47 Calculation of electricity demand charge

Year	Weekly Plant Capacity	Peak Demand Charge		Peak Maximum Demand		Shoulder Demand Charge		Shoulder Maximum Demand		Off-peak Demand Charge		Off-peak Maximum Demand		Variable Demand Charge			Variable Demand Charge
		Cents per KVA		kVA		Cents per KVA		kVA		Cents per KVA		kVA		$ per Month			$ per year
2019-20	1 ML to 280 ML	836.53	X	3502.00	+	811.71	X	3502.00	+	244.88	X	3502.00	=	68,400.04	X	12.00	=	820,800.47
2020-21	1 ML to 280 ML	836.61	X	3502.00	+	811.90	X	3502.00	+	244.62	X	3502.00	=	68,398.37	X	12.00	=	820,780.47
2021-22	1 ML to 280 ML	837.03	X	3502.00	+	811.90	X	3502.00	+	244.22	X	3502.00	=	68,399.19	X	12.00	=	820,790.22
2022-23	1 ML to 280 ML	836.89	X	3502.00	+	811.73	X	3502.00	+	244.61	X	3502.00	=	68,402.10	X	12.00	=	820,825.20

Table 48 Electricity Demand Charge

Electricity demand charge (18-19$)					
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**%Δ19-20 to 22-23**
Electricity demand charge (per annum)	$820.80	$820.78	$820.79	$820.83	0.0%
Electricity demand charge (per month)	$68.40	$68.40	$68.40	$68.40	0.0%

17.10 Variable charge for Essential Water

The formula for the variable charge is as follows:

Variable charge = Variable electricity charge + other electricity charge, where

- *Variable electricity charge = Peak Electricity Usage (kWh) for the corresponding weekly demand X (Peak Network Rate + Peak Retail Rate) + Shoulder Electricity Usage (kWh) for the corresponding weekly demand X (Shoulder Network Rate + Shoulder Retail Rate) + Off-peak Electricity Usage (kWh) for the corresponding weekly demand X (Off-peak Network Rate + Off-peak Retail Rate).*

- *Other electricity charge = Total Electricity Usage (kWh) for the corresponding weekly demand X Distribution Loss Factor X (Environmental Charge Rates + Market Charge Rates)*

The Peak Electricity Usage, Shoulder Electricity Usage, Off-peak Electricity Usage and Total Electricity Usage has been sourced from the O&M contract, updated with a subsequent variation[54], and would apply to Essential Water's electricity usage. Table 49 is the electricity usage table.

[53] See https://www.aer.gov.au/system/files/AER%20Approved%20-%20Endeavour%20Energy%20annual%20pricing%20proposal%202018-19%20updated%20-%20May%202018.pdf
[54] Table A1.6 of Attachment 3. See section 5.2.2 for variation.

Table 49 Electricity Usage Table

Weekly Plant Capacity (ML)	Maximum Variable Electricity Usage (kWh per ML)			
	Peak Variable Electricity	Shoulder Variable Electricity	Off-peak Variable Electricity	Total Variable Electricity
1 ML to 10 ML	1,745	3,490	8,223	13,458
11 ML to 20 ML	563	1,126	3,827	5,516
21 ML to 30 ML	343	685	3,006	4,034
31 ML to 40 ML	246	492	2,647	3,385
41 ML to 50 ML	192	384	2,446	3,022
51 ML to 60 ML	158	315	2,318	2,791
61 ML to 70 ML	134	267	2,228	2,629
71 ML to 80 ML	116	232	2,163	2,511
81 ML to 90 ML	103	205	2,113	2,421
91 ML to 100 ML	92	183	2,073	2,348
101 ML to 110 ML	83	180	2,026	2,289
111 ML to 120 ML	76	315	1,851	2,242
121 ML to 130 ML	70	428	1,703	2,201
131 ML to 140 ML	65	524	1,578	2,167
141 ML to 150 ML	60	607	1,469	2,136
151 ML to 160 ML	57	680	1,375	2,112
161 ML to 170 ML	102	695	1,292	2,089
171 ML to 180 ML	195	655	1,218	2,068
181 ML to 190 ML	274	622	1,156	2,052
191 ML to 200 ML	304	608	1,131	2,043
201 ML to 210 ML	304	608	1,131	2,043
211 ML to 220 ML	304	608	1,131	2,043
221 ML to 230 ML	304	608	1,131	2,043
231 ML to 240 ML	304	608	1,131	2,043
241 ML to 250 ML	304	608	1,131	2,043
251 ML to 260 ML	304	608	1,131	2,043
261 ML to 270 ML	304	608	1,131	2,043
271 ML to 280 ML	304	608	1,131	2,043

The cost inputs are as set out in Table 50 below. The 2019-20 and 2020-21 retail charges represent actual retail rates for peak, shoulder and off-peak periods (grey shaded area). The remaining cost inputs have been sourced from the ACIL report.

Table 50 Electricity charge pricing inputs

Electricity charge pricing inputs charge or factor				
Description	**19-20**	**20-21**	**21-22**	**22-23**
Peak Retail Rate (Cents per kWh) *	[redacted]	[redacted]	[redacted]	[redacted]
Shoulder Retail Rate (Cents per kWh) *	[redacted]	[redacted]	[redacted]	[redacted]
Off-peak Retail Rate (Cents per kWh) *	[redacted]	[redacted]	[redacted]	[redacted]
Peak Network Rate (Cents per kWh)	[redacted]	[redacted]	[redacted]	[redacted]
Shoulder Network Rate (Cents per kWh)	[redacted]	[redacted]	[redacted]	[redacted]
Off-peak Network Rate (Cents per kWh)	[redacted]	[redacted]	[redacted]	[redacted]
Environmental Charge Rates (Cents per kWh)	0.652	0.600	0.553	0.509
Market Charge Rates (Cents per kWh)	0.052	0.052	0.052	0.052
Distribution Loss Factor	1.033	1.033	1.033	1.033

* inclusive of any Distribution and Margin Loss Factors of, forecast at 1.0590, which incorporates a distribution loss factor of 1.0328 (as displayed above rounded to 3 decimal places) and a margin loss factor of 1.0253.

Annual updates will not apply to the retail electricity rates applied for the financial years 2019-20, 2020-21 FY19, FY20 as they are based on actual contracted rates. However, WaterNSW proposes to update the loss factors applied to the actual contracted retail rates. The FY20 loss factors are expected to known from early to mid 2019. The FY21 loss factors are expected to be applied to the actual retail electricity rates via the annual review mechanism explained below.

It is proposed that IPART implement an annual review mechanism to revise the cost inputs for the electricity rates with actual electricity rates. The charges would then be updated for each subsequent year under the annual review process (discussed in section 17.13).

It is proposed that the electricity rates for each subsequent regulatory year would be determined under the annual review process (discussed in section 17.13). It is noted that actual network rates and other ancillary charges are reviewed and approved annually by the AER in accordance with Part 1, rule 6.18 of the NER. WaterNSW submits that IPART will be able to rely on (and/or refer to) the decision of another regulator, in passing on the prudent and efficient costs of network electricity tariffs and other ancillary charges under an IPART determination.

The variable charges are shown in Table 51 below. The detailed calculations for the variable charge can be found in Appendix E of this pricing proposal.

Table 51 Variable Charges

Variable Charge ($ per ML) to Essential Water (18-19$)				
By weekly demand	**19-20**	**20-21**	**21-22**	**22-23**
1 ML to 10 ML	$2,000.13	$1,863.48	$1,580.86	$1,831.71
11 ML to 20 ML	$808.58	$752.79	$636.70	$726.52
21 ML to 30 ML	$586.25	$545.55	$460.54	$520.33
31 ML to 40 ML	$488.88	$454.78	$383.38	$430.00
41 ML to 50 ML	$434.42	$404.01	$340.23	$379.49
51 ML to 60 ML	$399.76	$371.71	$312.77	$347.36
61 ML to 70 ML	$375.47	$349.07	$293.52	$324.83
71 ML to 80 ML	$357.75	$332.55	$279.48	$308.39
81 ML to 90 ML	$344.26	$319.97	$268.79	$295.88
91 ML to 100 ML	$333.29	$309.75	$260.10	$285.70
101 ML to 110 ML	$324.78	$301.84	$253.43	$278.24
111 ML to 120 ML	$321.27	$298.73	$251.38	$279.48
121 ML to 130 ML	$318.09	$295.91	$249.49	$280.33
131 ML to 140 ML	$315.51	$293.62	$247.97	$281.14
141 ML to 150 ML	$313.03	$291.42	$246.47	$281.63
151 ML to 160 ML	$311.35	$289.94	$245.54	$282.51
161 ML to 170 ML	$309.68	$288.48	$244.59	$283.10
171 ML to 180 ML	$308.25	$287.23	$243.82	$283.67
181 ML to 190 ML	$307.31	$286.43	$243.39	$284.42
191 ML to 280 ML	$306.51	$285.71	$242.87	$284.29

17.11 Variable charge for Offtake customers

The formula for the variable charge for offtake customers (levied on a per offtake outlet basis) is as follows:

Variable charge = Variable electricity charge + other electricity charge, where

- *Variable electricity charge = Peak Electricity Usage (kWh) X (Peak Network Rate + Peak Retail Rate) + Shoulder Electricity Usage (kWh) X (Shoulder Network Rate + Shoulder Retail Rate) + Off-peak Electricity Usage (kWh) X (Off-peak Network Rate + Off-peak Retail Rate).*

- *Other electricity charge = Total Electricity Usage (kWh) for weekly demand of between 111ML and 120 x Distribution Loss Factor X (Environmental Charge Rates + Market Charge Rates)*

The Peak Electricity Usage, Shoulder Electricity Usage, Off-peak Electricity Usage and Total Electricity Usage is based on weekly demand of between 111MLs and 120MLs as sourced from the O&M contract[55], which is consistent with assumed total demand of 5,746ML from the pipeline inclusive of demand from offtake customers and Essential Water. This is shown in Table 52 below.

Table 52 Electricity Usage Tables

Weekly Plant Capacity (ML)	Maximum Variable Electricity Usage (kWh per ML)			
	Peak Variable Electricity	Shoulder Variable Electricity	Off-peak Variable Electricity	Total Variable Electricity
111 ML to 120 ML	76	315	1,851	2,242

The cost inputs can be found in Table 50 above.

The variable charges for offtake customers is shown in Table 53 below.

Table 53 Variable Charges Offtake Customers

Variable charge for offtake customers (18-19$)					
	19-20	20-21	21-22	22-23	%Δ19-20 to 22-23
Variable Charge (per KL)	$0.32	$0.30	$0.25	$0.28	-13.0%
Variable Charge (per ML)	$321.27	$298.73	$251.38	$279.48	-13.0%

17.12 Fixed electricity charge

The formula for the fixed electricity charge is as follows:

Fixed electricity charge = {Network Access Charge (per day) X 4 Network Access Points + Meter Charge (per day) X 4 Meters + Other fixed charges (per day)} X 365 days where the inputs are shown below for each year of the 2019-23 regulatory period:

Rate	Unit	19-20	20-21	21-22	22-23
Network Access Charge	*$ per day per NAP*	17.307	17.304	17.309	17.304
Network Access Points	*Number of NAPs*	4.000	4.000	4.000	4.000
Meter Charge	*$ per day per meter*	2.322	2.322	2.322	2.322

It is proposed that IPART implement an annual review mechanism to revise the cost inputs for the electricity demand charge with actual electricity prices. The demand charge for each subsequent regulatory year would be determined under the annual review process (discussed in section 17.13).

The calculation for the fixed electricity charge is set out in Table 54 and Table 55

[55] Table A1.6 of Attachment 3

Table 54 Calculation of Fixed Electricity Charge (18-19$)

Year	Network Access Charge		Network Access Point		Meter Charge		Number of Meters		Other Fixed Charges				Fixed Electricity Charge
	Charge per day		Number		Charge per day		Number		Charge per day				Per Annum
2019-20	(17.31	X	4	+	2.32	X	4	+	0.00)	X	365.00 days	=	28,659
2020-21	(17.30	X	4	+	2.32	X	4	+	0.00)	X	365.00 days	=	28,654
2021-22	(17.31	X	4	+	2.32	X	4	+	0.00)	X	365.00 days	=	28,661
2022-23	(17.30	X	4	+	2.32	X	4	+	0.00)	X	365.00 days	=	28,653

Table 55 Fixed Electricity Charge

Fixed electricity charge (18-19$)					
$'000	**19-20**	**20-21**	**21-22**	**22-23**	**%Δ19-20 to 22-23**
Fixed electricity charge	$28.66	$28.65	$28.66	$28.65	0.0%

17.13 Annual Reviews

We have requested annual reviews to the WACC in section 12 above and electricity charges in sections 17.9 to 17.12 above. In this section we also request a change to IPART's standard approach of applying an annual update which inflates prices by March to March CPI for each year of the regulatory period.

Under the O&M contract, the fixed operation and maintenance charges as well as the standby, restart and shutdown charges, are inflated by an index which is weighted 29.46 per cent by the Wage Price Index (WPI) and 70.54 per cent by the Customer Price Index (CPI).

It is proposed that these charges also be inflated by an index with a 70:30 CPI to WPI weighting. These updates would occur annually.

As mentioned in section 17.9 and section 17.10 above, actual network rates and other ancillary charges are reviewed and approved annually by the AER in accordance with Part 1, rule 6.18 of the NER.

WaterNSW submits that IPART will be able to rely on the decision on another regulator, in passing on the prudent and efficient costs of network electricity tariffs and other ancillary charges under an IPART determination.[56]

Table 56 below summaries the WaterNSW's proposal on the annual reviews by each charge category.

[56] WaterNSW considers this approach may be appropriate in developing other pass through mechanisms such as the Shoalhaven pass through mechanism for the WaterNSW Greater Sydney Determination.

Table 56 Annual update by charge category

Charge	Annual Update
WaterNSW charge (EW and offtake customers)	• Inflate by ABS March to March CPI each year • Annually update the cost of debt for the WACC
Fixed operational and maintenance charge (EW)	Inflate by an index with a 70:30 CPI to WPI weighting using ABS March to March indexes
Electricity Demand Charge (EW)	Annually update the electricity tariff inputs with annual electricity tariffs
Fixed Electricity Charge (EW)	Annually update the electricity tariff inputs with annual electricity tariffs
Variable cost (EW and offtake customers)	Annually update the electricity tariff inputs, with actual electricity tariffs. Annual updates will not apply to the retail electricity rates applied for the financial years 2019-20, 2020-21 FY19, FY20 as they are based on actual contracted rates. However, WaterNSW proposes to update the loss factor which has been applied to the actual contracted retail rates.
Standby, shutdown and restart payments (EW)	Inflate by an index with a 70:30 CPI to WPI weighting using ABS March to March indexes

17.14 Efficiency Sharing Mechanism

The O&M contract includes an efficiency benefit sharing scheme between WaterNSW and the pipeline contractor for the energy requirements of the pipeline.

Under the O&M contract, after the end of the operating year, contractor must share with WaterNSW 50% of its electricity savings. The electricity savings are determined as the difference between the actual amount of electricity consumed, and the electricity costs generated under the O&M contract using the fixed contractual electricity volumes multiplied by the actual electricity rate determined under the PSA negotiated by the contractor with the market.

Electricity savings may be generated if the contractor realises operational efficiencies, where the amount of electricity consumed is less than the contractual electricity volumes (i.e. efficiencies from the quantities, not the price). It provides an incentive for operators to reduce electricity prices through innovative solutions such as demand side management.

WaterNSW proposes to pass its share of the efficiencies to Essential Water in the year after the efficiencies are realised. The efficiencies would be passed on as a rebate to Essential Water.

Our proposal to annually update the electricity charges with actual electricity tariffs is a prerequisite to implementing an efficiency sharing mechanisms with Essential Water. A decision by IPART to set an electricity forecast would transfer all the forecasting risk to WaterNSW (e.g. revenue shortfall between the benchmark rate and actual electricity costs). In such circumstances, it will not be possible for WaterNSW to share an efficiency which arises out of the O&M contract with Essential Water unless the revenue under IPART determination is sufficient to meet actual electricity costs over the term of the determination period.

17.15 Capital charge for additional offtakes

WaterNSW will offer to install additional offtakes at cost over the 2019-23 regulatory period via either the annual charge or an upfront capital charge. [57]

[57] Noting that any additional supply will be subject to the availability of capacity in the pipeline.

The O&M contract allows for the installation of additional offtakes at a fixed cost of $70,290 plus an agreed margin for profit and overhead of 10%.[58]

This offer may be attractive to additional pastoral customers or customers engaged in large scale commercial activities (such as mining). Customers who pay this upfront capital charge will only thereafter be required to pay the variable charge for each ML (or kiloliter) of water ordered/delivered.

The upfront capital charge is shown in Table 57, and the variable charge is shown in Table 58 (the same as the variable charge for existing offtake customers).

Table 57 Capital Charge - Additional Offtakes

Upfront capital charge for each additional offtake (nominal $)	
Upfront capital charge	$77,319

Table 58 Variable Charge for Offtake customers (levied on a per offtake outlet basis)

Variable charge for offtake customers (18-19$)					
	19-20	**20-21**	**21-22**	**22-23**	**%Δ19-20 to 22-23**
Variable Charge (per KL)	$0.32	$0.30	$0.25	$0.28	-13.0%
Variable Charge (per ML)	$321.27	$298.73	$251.38	$279.48	-13.0%

17.16 Impact on customer charges

As this is a new service, it is not possible to compare the incremental bill impact of providing the pipeline services to Essential Water. The following table sets out WaterNSW's proposed bill to Essential Water for assuming demand of 5,716ML from Essential Water.

Table 59 Bill Impact analysis

Charge (18-19$ '000)	19-20	20-21	21-22	22-23
WaterNSW charge	$27,021.11	$26,814.78	$26,570.24	$26,373.56
Fixed operational and maintenance charge	$1,595.96	$1,598.33	$1,587.10	$1,585.28
Electricity Demand Charge	$820.80	$820.78	$820.79	$820.83
Fixed Electricity Charge	$28.66	$28.65	$28.66	$28.65
Variable electricity costs	$1,847.13	$1,729.24	$1,474.04	$1,656.81
Total Bill	**$31,313.65**	**$30,991.78**	**$30,480.82**	**$30,465.13**
Total Bill (nominal$)*	**$32,096.49**	**$32,560.74**	**$32,824.51**	**$33,627.81**

* assuming CPI of 2.5% per annum as specified by IPART.

The analysis below quantifies the bill for each offtake customer under assumed usage of 10MLs or 10,000 kiloliters. The total bill is expressed in 18-19 dollars. The total bill is $13,500 per annum in nominal terms assuming CPI of 2.5% per annum, as specified by IPART.

[58] Schedule 15 of the O&M contract.

Table 60 Bill for offtake customers (levied on a per offtake outlet basis)

Charge (18-19$)	19-20	20-21	21-22	22-23
WaterNSW charge	$9,958.07	$9,862.23	$10,022.27	$9,435.50
Variable electricity costs	$3,212.66	$2,987.26	$2,513.82	$2,794.83
Total Bill	**$13,170.73**	**$12,849.49**	**$12,536.09**	**$12,230.33**
Total Bill (nominal$)	**$13,500.00**	**$13,500.00**	**$13,500.00**	**$13,500.00**

18. Impacts on the agency – credit ratings, financial viability and financeability

18.1 Background

Financeability refers to the capacity of a business to finance its activities – including its day-to-day operations and its capital investments to replace, renew and expand the infrastructure required for these activities.

IPART conducts a financeability test as part of its pricing determination process, using a methodology issued in December 2013. At the time of this submission IPART is currently reviewing its financeability test methodology.

The objective of the financeability test is to ensure the regulated utility is "financeable" over the course of the regulatory determination – that is, is sufficiently likely to be able to meet its financial commitments, remain solvent and access capital markets. The test is made with reference to a "Baa2 / BBB" rated regulated utility.

IPART uses three financial ratios to apply its financeability test:

- FFO / Interest expense
- FFO / Net Debt
- Net Debt / RAB

where FFO = Funds from Operations.

These financial ratios were selected to align with the credit rating methodology then used by Moody's Investor Services – the Global Water Ratings Methodology (2012)[59].

18.2 Application of ratios

IPART's December 2013 Financeability Test Method utilises "actual" inputs, which are to be provided by the utility while its 2018 Financeability Review Issues Paper proposes using both notional and actual inputs.

For the pipeline, actual and notional inputs will be very similar, given:

- WaterNSW's capital structure target of 60% Net Debt to RAB – outlined in its 2017-18 Statement of Corporate Intent (SCI) and consistent with NSW Government Capital Structure Policy TPP16-03 *Capital Structure Policy for Government Businesses* – noting that this is consistent with the IPART notional efficient capital structure assumption
- WaterNSW's debt management strategy for the pipeline is to replicate the IPART cost of debt methodology – as published in IPART's 2018 WACC Methodology Review Final Report. This will result in 70% of the debt raised during construction refinancing over the course of the regulatory period and actual interest costs being very close to the debt allowance
- WaterNSW's SCI assumptions are based on IPART WACC Market Update midpoints. This results in our forecasts aligning to the notional WACC midpoint parameters.

In constructing notional financial statements with "notional" inputs, we have used revenue, operating cost, capital expenditure and WACC assumptions consistent with this proposal. Other assumptions we have made in applying the financeability test are:

[59] Moody's has since updated its methodology in December 2015, which IPART will consider as part of its review.

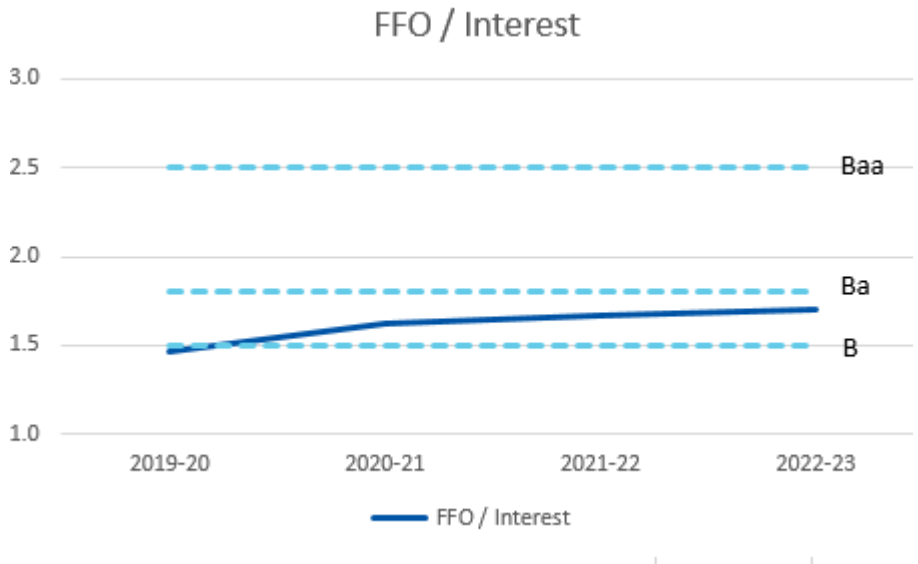
- interest rate of 5.8% pre-tax nominal – consistent with the IPART WACC Market Update midpoint
- gearing of 60% - which is consistent with WaterNSW's 2017-18 Statement of Corporate Intent (SCI) – noting that at the date of this proposal the 2018-19 SCI has not yet been signed by the WaterNSW Board or shareholder Ministers
- FFO has been calculated based on Accounts Receivable Days of 30 and Accounts Payable Days of 45
- no adjustments for operating leases or pension adjustments are necessary.

The results of the ratios on the pipeline project are set out in Table 61 and Figure 17 & Figure 18 below.

Table 61 Financeability Ratios

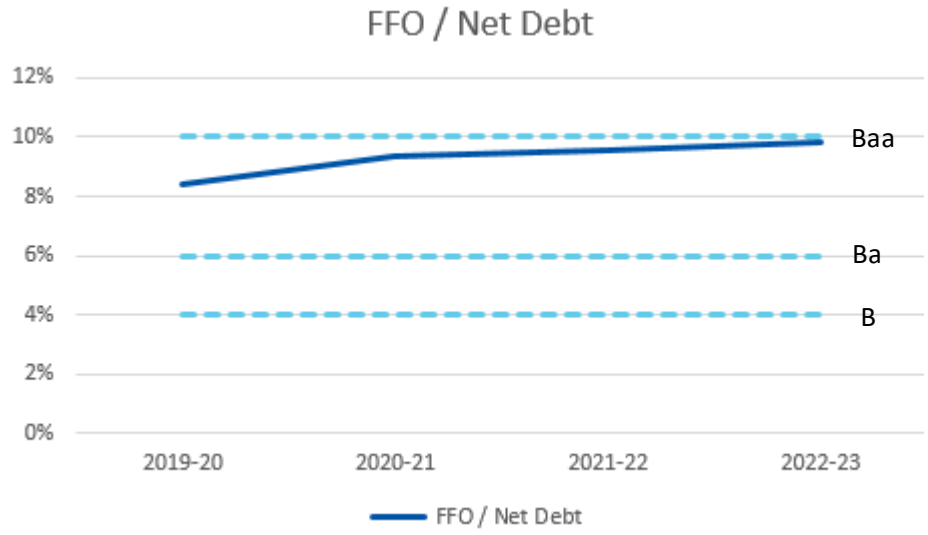
Financeability Ratios				
	2019-20	**2020-21**	**2021-22**	**2022-23**
FFO / Interest Expense	1.5	1.6	1.7	1.7
FFO / Net Debt	8%	9%	10%	10%
Net Debt / RAB	60%	60%	60%	60%

Figure 17 FFO/Interest



*The 2019-20 ratios are affected by a once-off working capital (timing) impact, driven by the 30 days receivable assumption for collection of revenue (and 45 days payable for payment of opex).

Figure 18 FFO/Net Debt



As Table 61 Financeability Ratios and Figure 17 & Figure 18 above show, at the 60% notional (and actual) Net Debt / RAB gearing level, the FFO / Interest ratio is within the “Ba” Moody’s credit rating sub-factor band, and the FFO / Net Debt is within the “Baa” Moody’s credit rating sub-factor band. Overall, for the 2019-2023 determination period, we consider that this will be consistent with a Baa2 credit rating, although there may be some downside risk, given the “Ba” FFO / Interest ratio and using the assumptions noted above, we do not consider there will be a financeability issue in the determination period.

However, we consider the financeability ratios could be adversely affected, and a financeability could issue arise, if the assumptions are varied – such as WACC.

19. Quality assurance and CEO Declaration

Chief Executive Officer's Declaration

In accordance with the *Guidelines for Water Agency Pricing Submission,* December 2017 (the Guidelines), of the Independent Pricing and Regulatory Tribunal of New South Wales, I declare that:

a) the information provided in our pricing submission submitted on 29 June 2018 is the best information of the financial operational affairs of WaterNSW with respect to the Wentworth to Broken Hill Pipeline and has been checked in accordance with the Guidelines; and

b) there are no circumstances of which I am aware that would render the information provided to be misleading or inaccurate.

Certified by the Chief Executive Officer:

[redacted]

29 June 2018

David Harris

Date

29 June 2018

Mr Stevan Munic
Regulatory Economist
WaterNSW
Level 13, 169 Macquarie Street
Parramatta, NSW 2150

Dear Stevan

Re: WaterNSW Wentworth To Broken Hill Pipeline Pricing Proposal 2018
Quality Assurance Review Findings

Sapere Research Group ("**Sapere"** or **"we"**) has undertaken quality assurance procedures over the Wentworth to Broken Hill Pipeline Pricing Proposal prepared by WaterNSW (**Pricing Submission**). This letter sets out the procedures we have undertaken and the findings of these procedures.

Scope Limitations
The scope of our engagement does not provide for an absolute opinion on the accuracy and completeness of information provided in the Pricing Submission.

We have not been requested, nor have we undertaken, an audit of the information in the Pricing Submission. Our findings are limited to the procedures we have undertaken.

Procedures
We have reviewed the Pricing Submission, in accordance with the following guidelines provided by IPART [Guidelines for Water Agency Pricing Submissions December 2017]:

1. Information in your pricing submission is consistent with the information return (AIR and SIR), your financial accounts, and reports against output measures, as relevant. Where there are variations in figures, these need to be explained.
2. Figures in your pricing submission are accurate and correctly sourced. The figures need to sum correctly. Your use of nominal or real dollars should also be explained in clear and simple terms so that stakeholders can follow the logic of their use.
3. Your pricing submission addresses all the information we have requested (such as in the SIP or the Issues Paper, these Guidelines, or in correspondence [for the purpose of this QA -- IPART's SIP letter]).
4. Your pricing submission includes proposed prices for all your regulated services.

Only procedures stated in this letter have been undertaken in our quality assurance review.

For the avoidance of any doubt, we highlight the following examples of aspects of the Pricing Submission which are not included in the scope of this quality assurance review:

1. non-financial information;
2. reviewing the methodology applied by WaterNSW;
3. checking the accuracy of all calculations in WaterNSW workings; and
4. ensuring the accuracy of source data relied upon by WaterNSW.

Findings
In conducting the review, we identified matters which we believe WaterNSW has subsequently addressed. We form the conclusion we have no reason to believe that the WaterNSW's Pricing Submission does not comply.

Independence
The quality assurance procedures have been undertaken by staff members of Sapere that have not been involved in the preparation of the Pricing Submission.

Richard Tooth
Director
Sapere Research Group Pty Ltd

Sydney
29th June 2018

20. Glossary

ABS	Australian Bureau of Statistics
ACHA	Aboriginal Cultural Heritage Assessment
ACHCR	Aboriginal Cultural Heritage Consultation Requirement
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AHIP	Aboriginal Heritage Impact Permit
Australia ICOMOS	Australian ICOMOS Charter of Places of Cultural Significance
Capex	Capital Expenditure
CCPP	Calcium Carbonate Precipitation Potential
CEMP	Construction Environmental Management Plan
CER	Clean Energy Regulator
Construction Direction	Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017
CTP	Capacity to Pay
CHAR	Cultural Heritage Assessment Report
CPI	Consumer Price Index
D&C	Design and construct
DBOM	Design, build, operate and maintain
DECCW	Department of Environment, Climate Change and Water (NSW)
DLF	Distribution Loss Factor
DoI	NSW Department of Industry, Local Land Services
DSE	Dry Sheep Equivalent
Early Water Services	The supply of water after the Ready for Water milestone has been reached but before practical completion of the pipeline
EOI	Expression of Interest
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
ESC	Energy Saving Certificate
ESS	Energy Savings Scheme
EW	Essential Water
FFO	Funds from Operations
FTE	Full Time Equivalent
GHD Forecast	Projection of the water demand for the pipeline produced by consultancy GHD
HA	Hectare
HS	High Security
ICOMOS	International Council on Monuments and Sites

IPART	Independent Regulatory and Pricing Tribunal
IPART Act	Independent Regulatory and Pricing Tribunal Act 1992 (NSW)
IPART Final WACC Report	IPART's Final Report "Review of our WACC Method" February 2018
IPART Methodology	IPART's updated methodology published in the IPART Final WACC Report
IV	Independent Verifier
JHJV	John Holland Pty Ltd Joint Ventures with MPC Group Pty Ltd t/as John Holland MPC Group Joint Venture for the D&C Contract and Trility Pty Ltd t/as John Holland Trility Joint Venture for the O&M Contract
kL	Kilo litre
kVA	Kilo volt ampere (1000 times volt times ampere)
kWh	Kilowatt hour (3.6 megajoules)
LGC	Large-scale Generation Certificate
LRET	Large-scale Renewable Energy Target
Minimum Take	8ML in any 24 hour period
MCL	Maximum Credit Limit
ML	Megalitre
MLF	Marginal Loss Factor
NEM	National Electricity Market
NER	National Electricity Rules
NPV	Net Present Value
NPW Act	National Parks and Wildlife Act 1974 (NSW)
NSW	New South Wales
NT Act	Native Title Act (Cth)
NTER	National Tax Equivalent Regime
O&M	Operation and maintain
OEH	Office of Environmental Heritage
Opex	Operating Expenditure
ORF	Offtake Reduction Factor
ORP	Offtake Reduction Percentage
P90	A probability of exceedance measure. p90 means that 90% of the estimates exceedance the p90 estimate
PE	Polyethylene
Peak Season	December - March
Pipeline Direction	Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016
PLC	Programmable Logic Controller
PN35	3.5MPa or 3.5 megapascals

Power Supply Agreement	Agreement with an energy retailer
PSA	Power Supply Agreement
PSR	Price Scanning Range
PWA	Public Works Advisory, NSW Water Solutions
RAB	Regulated Asset Base
RAP	Registered Aboriginal Parties
Ready for Water	The point at which the pipeline is able to be operated safely to deliver 8 ML of water per 24 hour period
REF	Environmental Factors Report
RET	Renewable Energy Target
RFT	Request for Tender
Right of Way	Where the pipe will be laid
ROR	Rate of Return
RPP	Renewable Power Percentage
RNN	Regional Reference Node
SCADA	Supervisory Control and Data Acquisition
SCI	Statement of Corporate Intent
SOC Act	State Owned Corporations Act 1989 (NSW)
SP 1	Separable Portion 1
SP2	Separable Portion 2
SP3	Separable Portion 3
SPV	Special Purpose Vehicle
SRES	Small-scale Renewable Energy Scheme
STC	Small-scale Technology Certificate
STP	Small-scale Technology Percentage
WACC	Weighted Average Cost of Capital
WAL	Water Access Licence
WaterNSW Act	Water NSW Act 2014 NSW
WEC	Wholesale Electricity Charge
WLD	Western Lands Division
WPI	Wage Price Index

Attachment A – Pipeline Direction

New South Wales

Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016

under the

State Owned Corporations Act 1989

I, Niall Blair, MLC, Minister for Lands and Water, with approval of the Treasurer, in pursuance of section 20P of the *State Owned Corporations Act 1989*, make the following direction to the Board of WaterNSW, being satisfied that because of exceptional circumstances, it is necessary to give the direction in the public interest.

Dated this 21st day of November, 2016.

[redacted]

Minister for Lands and Water

Explanatory note

This direction is made under section 20P of the *State Owned Corporations Act 1989*. The object of this direction is to require WaterNSW to arrange for the construction, operation and maintenance of a pipeline from the Murray River to Broken Hill along the Silver City Highway. This direction will ensure that the people of Broken Hill have long term water security.

Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016

under the

State Owned Corporations Act 1989

1 Name of Direction

This direction is the *Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016*.

2 Commencement

This direction commences on the day on which it is signed and will remain in force until it is revoked, either in whole or in part.

3 Direction

The Board of WaterNSW is directed to:

a) Arrange for the construction, operation and maintenance of a pipeline from the Murray River to deliver low salinity raw water to the existing Mica Street Water Treatment Plant in Broken Hill, including any associated infrastructure necessary for operation such as new or upgraded distribution pipelines or pump stations. The pipeline is to generally run along the Silver City Highway road easement.

b) Use best endeavours to ensure that supply from the pipeline, when used in conjunction with the current Broken Hill water supply infrastructure, can meet peak daily demand of up to 37.4 mega-litres of water per day.

c) Use best endeavours to make the pipeline operational by December 2018, and notwithstanding this, ensure that the pipeline is fully operational before all surface water and the Lake Menindee groundwater source available to the Broken Hill community are depleted.

d) Fund the capital costs for constructing the pipeline from within WaterNSW's existing resources or otherwise borrow the required funds, recognising that the Independent Pricing and Regulatory Tribunal will be asked by Government to allow WaterNSW to recover the total efficient cost associated with the ongoing operation of the pipeline, including the cost of capital.

e) Chair and regularly consult with a Project Consultative Committee established for the project involving representation from the Department of Primary Industries, Department of Premier and Cabinet, NSW Treasury, NSW Planning and Environment, Infrastructure NSW, Essential Energy and NSW Public Works.

f) Report on progress of the project to Infrastructure NSW under the High Profile, High Risk reporting framework.

Attachment B – Construction Direction

New South Wales

Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017

under the

State Owned Corporations Act 1989

I, Niall Blair, MLC, Minister for Regional Water, with approval of the Treasurer, in pursuance of section 20P of the *State Owned Corporations Act 1989*, make the following direction to the Board of WaterNSW, being satisfied that because of exceptional circumstances it is necessary to give the direction in the public interest.

Dated this 31st day of August, 2017.

[redacted]

Minister for Regional Water

Explanatory note

This direction is made under section 20P of the *State Owned Corporations Act 1989*. The object of this direction is to require WaterNSW to ensure that the pipeline, the subject of the previous Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016, is constructed substantially of Australian rolled steel (irrespective of place of manufacture of the pipe) and the project meets the minimum targets of the NSW Infrastructure Skills Legacy Program, to the extent that is possible given the remote location of the project.

Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017

under the

State Owned Corporations Act 1989

1 Name of Direction

This direction is the *Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017*.

2 Commencement

This direction commences on the day on which it is signed and will remain in force until it is revoked, either in whole or in part.

3 Direction

The Board of WaterNSW is directed to ensure that:

a) the minimum targets set in the NSW Infrastructure Skills Legacy Program are met for the construction of the pipeline, in consultation with the Department of Industry to the extent possible given the remote location of the project and with relevant targets negotiated through the tender process; and

b) Australian rolled steel is substantially used in the construction of the pipeline, regardless of where the pipe is manufactured.

Attachment C – Direction to IPART

New South Wales

Direction to the Independent Pricing and Regulatory Tribunal in relation to the construction and operation of the Broken Hill pipeline 2018

under the

Independent Pricing and Regulatory Tribunal Act 1992

I, Niall Blair, MLC, Minister for Regional Water, with approval of the Premier, in pursuance of section 16A of the *Independent Pricing and Regulatory Tribunal Act 1992*, make the following direction to the Independent Pricing and Regulatory Tribunal.

Dated this 19th day of April, 2018.

[redacted]

The Hon. Niall Blair MLC
Minister for Regional Water

Explanatory note

This direction is made under section 16A of the *Independent Pricing and Regulatory Tribunal Act 1992*. The object of this direction is to require the Independent Pricing and Regulatory Tribunal, when making determinations of pricing for the government monopoly services relating to the Murray River to Broken Hill pipeline to include an amount or factor in its methodology representing the efficient cost of complying with the following two section 20P directions issued to Water NSW under the *State Owned Corporations Act 1989:* the first issued on 21 November 2016 to construct, operate and maintain the Murray River to Broken Hill pipeline and the second issued on 31 August 2017 to ensure that in constructing the Murray River to Broken Hill pipeline, the minimum targets set in the Government's Infrastructure Skills Legacy Program are met and that the pipeline is constructed substantially using Australian rolled steel.

Direction to the Independent Pricing and Regulatory Tribunal in relation to the construction and operation of the Broken Hill pipeline 2018

under the

Independent Pricing and Regulatory Tribunal Act 1992

1 Name of Direction

This direction is the *Direction to the Independent Pricing and Regulatory Tribunal in relation to the construction and operation of the Broken Hill pipeline 2018*.

2 Commencement

This direction commences on the day on which it is signed and will remain in force until it is revoked, either in whole or in part.

3 Direction

The Independent Pricing and Regulatory Tribunal is directed, when making determinations of pricing for the Services, to include an amount or factor in its methodology representing the efficient cost of complying with the Section 20P Directions.

4 Definitions

In this direction:

Section 20P Directions means the following directions issued to WaterNSW under section 20P of the *State Owned Corporations Act 1989*:

(a) the *Direction to the Board of WaterNSW to secure the water supply of Broken Hill 2016* dated 21 November 2016; and

(b) the *Direction to the Board of WaterNSW in relation to the construction of the Broken Hill pipeline 2017* dated 31 August 2017.

Services means the services that are:

(a) supplied by WaterNSW by means of or in connection with the Murray River to Broken Hill pipeline; and

(b) declared to be government monopoly services for the purposes of the *Independent Pricing and Regulatory Tribunal Act 1992*.

Attachment D - Separate charging arrangements for Offtake customers and Essential Water

Proposed amendment 1:

The formula for the variable electricity charge in the O&M contract could be amended to include a separate formula on variable electricity charges for each customer class:

- Essential Water
- Offtake customers downstream of Pump Station 1
- Offtake customers upstream of the Pump Station 1.

The total variable electricity charge used as an input for the electricity payment calculation (in clause 7 of schedule 3 of the contract) would be determined using the sum of the variable electricity charge for each customer class.

The variable electricity charge for Essential Water would be determined as follows:

$$\sum_{w=1}^{k}(V_w \times EC_w \times ~~ORF_w~~)$$

Where V_w = total volume of water extracted by Essential Water only (changed from water extracted by EW + offtake customers)

The variable electricity charge for offtake customers downstream from the pump station would be determined as follows:

$$\sum_{w=1}^{k}(V_w \times EC_w \times ~~ORF_w~~)$$

Where V_w = total volume of water extracted by the offtake customers downstream of the pump station (changed from water extracted by EW + offtake customers)

(downstream of the pump station means beyond the 8.75km chainage point of the transfer pump station – A1.7 Schedule 3 payment schedule)

The variable electricity charge for offtake customers upstream of the pump station would be determined as follows:

$$\sum_{w=1}^{k}(V_w \times EC_w \times ~~ORF_w~~)$$

$$\sum_{w=1}^{k}(V_w \times EC_w \text{ X ORP}$$

Where V_w = total volume of water extracted by offtake customers upstream of the pump station (changed from water extracted by EW + offtake customers)
ORP (offtake reduction percentage) = 94.44% from A1.7 payment schedule (changed from ORF (offtake reduction factor))

(upstream of the pump station means 8.75km chainage point of the transfer pump station – A1.7 Schedule 3 payment schedule)

The approach above apportions the benefit of the ORF/P (offtake reduction factor/price) to the offtake customers upstream of the pump station (i.e. reducing the variable electricity charge for the offtake customers upstream of the pump station, by the ORP, instead of the current approach

which reduces the total variable charge for all customers, by the ORF). The proposed change is revenue neutral to WaterNSW.

Note that WaterNSW does not anticipate having any offtake customers upstream of the first pump station (closest to the Murray River). Therefore, we have not proposed a separate variable charge for this eventuality. All offtake customers are expected to be located beyond the 8.75km chainage point of transfer pump station 1.

Proposed amendment 2:

The electricity volumes in table A1.6 of the payment schedule of the O&M contract would have to be amended to include a separate electricity volumes table for both offtake customers and essential water.

The current table (A1.6) could be retained to determine the electricity volumes for Essential Water, subject amendments to the heading of table A1.6 from "*ML extracted by Essential Water and Offtake Users for Whole Week*" to "*ML extracted by Essential Water for Whole Week*".

A separate table (A1.6b) should be inserted into the payment schedule to determine the electricity volumes for the offtake customers. The table should include the following:

- The maximum variable electricity demand (kVA) should be set to nil, as the electricity demand charge should be paid for by Essential Water, as they 'turn on' the pipeline. We would not turn on the pipeline for an offtake customer who orders 1 ML of water, as the cost would be prohibitive (~$68,400 per month in 18-19$ as per Table 34).

- The maximum variable electricity usage volumes should be based on the rate for Peak Variable Electricity, Shoulder Variable Electricity and Off-peak Variable Electricity (as per below) under assumed average usage. The table below uses the electricity usage for between 111 MLs to 120 MLs per week extracted by all customers.

Table 62 Proposed electricity volumes - offtake customers

ML extracted by Offtake Users for Whole Week	Maximum Variable Electricity Usage (kWh per ML)				Maximum Variable Electricity Demand (kVA)		
	Peak Variable Electricity	Shoulder Variable Electricity	Off-peak Variable Electricity	Total Variable Electricity	Peak Maximum Demand	Shoulder Maximum Demand	Off-peak Maximum Demand
0.001 ML to 280	76	315	1,851	2,242	N/A	N/A	N/A

Attachment E – Calculation of electricity charges

2019-20 Variable Charges

Weekly Plant Capacity	Peak Electricity Usage		Peak Network Rate	Peak Retail Rate		Shoulder Electricity Usage		Shoulder Network Rate	Shoulder Retail Rate		Off-peak Electricity Usage		Off-peak Retail Rate	Off-peak Network Rate		Variable Electricity Charge				Electricty Charge
	kWh per ML		Cents per kWh			kWh per ML		Cents per kWh			kWh per ML		Cents per kWh			Cents per ML				$ per ML
1 ML to 10 ML	1,745	X	[redacted]	+	+	3,490	X	[redacted]	+	+	8,223	X	[redacted]	+	=	190224.95	/	100	=	1902.25
11 ML to 20 ML	563	X	[redacted]	+	+	1,126	X	[redacted]	+	+	3,827	X	[redacted]	+	=	76846.40	/	100	=	768.46
21 ML to 30 ML	343	X	[redacted]	+	+	685	X	[redacted]	+	+	3,006	X	[redacted]	+	=	55691.42	/	100	=	556.91
31 ML to 40 ML	246	X	[redacted]	+	+	492	X	[redacted]	+	+	2,647	X	[redacted]	+	=	46425.77	/	100	=	464.26
41 ML to 50 ML	192	X	[redacted]	+	+	384	X	[redacted]	+	+	2,446	X	[redacted]	+	=	41243.83	/	100	=	412.44
51 ML to 60 ML	158	X	[redacted]	+	+	315	X	[redacted]	+	+	2,318	X	[redacted]	+	=	37946.54	/	100	=	379.47
61 ML to 70 ML	134	X	[redacted]	+	+	267	X	[redacted]	+	+	2,228	X	[redacted]	+	=	35634.67	/	100	=	356.35
71 ML to 80 ML	116	X	[redacted]	+	+	232	X	[redacted]	+	+	2,163	X	[redacted]	+	=	33949.27	/	100	=	339.49
81 ML to 90 ML	103	X	[redacted]	+	+	205	X	[redacted]	+	+	2,113	X	[redacted]	+	=	32664.98	/	100	=	326.65
91 ML to 100 ML	92	X	[redacted]	+	+	183	X	[redacted]	+	+	2,073	X	[redacted]	+	=	31621.85	/	100	=	316.22
101 ML to 110 ML	83	X	[redacted]	+	+	180	X	[redacted]	+	+	2,026	X	[redacted]	+	=	30813.55	/	100	=	308.14
111 ML to 120 ML	76	X	[redacted]	+	+	315	X	[redacted]	+	+	1,851	X	[redacted]	+	=	30496.09	/	100	=	304.96
121 ML to 130 ML	70	X	[redacted]	+	+	428	X	[redacted]	+	+	1,703	X	[redacted]	+	=	30208.13	/	100	=	302.08
131 ML to 140 ML	65	X	[redacted]	+	+	524	X	[redacted]	+	+	1,578	X	[redacted]	+	=	29974.71	/	100	=	299.75
141 ML to 150 ML	60	X	[redacted]	+	+	607	X	[redacted]	+	+	1,469	X	[redacted]	+	=	29749.98	/	100	=	297.50
151 ML to 160 ML	57	X	[redacted]	+	+	680	X	[redacted]	+	+	1,375	X	[redacted]	+	=	29599.02	/	100	=	295.99
161 ML to 170 ML	102	X	[redacted]	+	+	695	X	[redacted]	+	+	1,292	X	[redacted]	+	=	29449.22	/	100	=	294.49
171 ML to 180 ML	195	X	[redacted]	+	+	655	X	[redacted]	+	+	1,218	X	[redacted]	+	=	29320.88	/	100	=	293.21
181 ML to 190 ML	274	X	[redacted]	+	+	622	X	[redacted]	+	+	1,156	X	[redacted]	+	=	29238.41	/	100	=	292.38
191 ML to 200 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
201 ML to 210 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
211 ML to 220 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
221 ML to 230 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
231 ML to 240 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
241 ML to 250 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
251 ML to 260 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
261 ML to 270 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65
271 ML to 280 ML	304	X	[redacted]	+	+	608	X	[redacted]	+	+	1,131	X	[redacted]	+	=	29165.07	/	100	=	291.65

inclusive of any Distribution and Margin Loss Factors

2019-20 Variable Charges (continued)

Weekly Plant Capacity	Total Electricity Usage		Distribution Loss Factor		Environmental Charge Rates		Market Charge Rates		Other Variable Electricity Charge				Other Variable Electricity Charge
	kWh per ML		Unit		Cents per kWh				Cents per ML				$ per ML
1 ML to 10 ML	13,458	X	1.033	X	(0.652	+	0.052)	=	9787.60	/	100	=	97.88
11 ML to 20 ML	5,516	X	1.033	X	(0.652	+	0.052)	=	4011.62	/	100	=	40.12
21 ML to 30 ML	4,034	X	1.033	X	(0.652	+	0.052)	=	2933.81	/	100	=	29.34
31 ML to 40 ML	3,385	X	1.033	X	(0.652	+	0.052)	=	2461.81	/	100	=	24.62
41 ML to 50 ML	3,022	X	1.033	X	(0.652	+	0.052)	=	2197.81	/	100	=	21.98
51 ML to 60 ML	2,791	X	1.033	X	(0.652	+	0.052)	=	2029.81	/	100	=	20.30
61 ML to 70 ML	2,629	X	1.033	X	(0.652	+	0.052)	=	1911.99	/	100	=	19.12
71 ML to 80 ML	2,511	X	1.033	X	(0.652	+	0.052)	=	1826.18	/	100	=	18.26
81 ML to 90 ML	2,421	X	1.033	X	(0.652	+	0.052)	=	1760.72	/	100	=	17.61
91 ML to 100 ML	2,348	X	1.033	X	(0.652	+	0.052)	=	1707.63	/	100	=	17.08
101 ML to 110 ML	2,289	X	1.033	X	(0.652	+	0.052)	=	1664.72	/	100	=	16.65
111 ML to 120 ML	2,242	X	1.033	X	(0.652	+	0.052)	=	1630.54	/	100	=	16.31
121 ML to 130 ML	2,201	X	1.033	X	(0.652	+	0.052)	=	1600.72	/	100	=	16.01
131 ML to 140 ML	2,167	X	1.033	X	(0.652	+	0.052)	=	1575.99	/	100	=	15.76
141 ML to 150 ML	2,136	X	1.033	X	(0.652	+	0.052)	=	1553.45	/	100	=	15.53
151 ML to 160 ML	2,112	X	1.033	X	(0.652	+	0.052)	=	1535.99	/	100	=	15.36
161 ML to 170 ML	2,089	X	1.033	X	(0.652	+	0.052)	=	1519.27	/	100	=	15.19
171 ML to 180 ML	2,068	X	1.033	X	(0.652	+	0.052)	=	1503.99	/	100	=	15.04
181 ML to 190 ML	2,052	X	1.033	X	(0.652	+	0.052)	=	1492.36	/	100	=	14.92
191 ML to 200 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
201 ML to 210 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
211 ML to 220 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
221 ML to 230 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
231 ML to 240 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
241 ML to 250 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
251 ML to 260 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
261 ML to 270 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86
271 ML to 280 ML	2,043	X	1.033	X	(0.652	+	0.052)	=	1485.81	/	100	=	14.86

Weekly Plant Capacity	Electricity Charge		Other Variable Electricity Charge		Total Variable Electricity Charge
	$ per ML				
1 ML to 10 ML	1902.25	+	97.88	=	2,000.13
11 ML to 20 ML	768.46	+	40.12	=	808.58
21 ML to 30 ML	556.91	+	29.34	=	586.25
31 ML to 40 ML	464.26	+	24.62	=	488.88
41 ML to 50 ML	412.44	+	21.98	=	434.42
51 ML to 60 ML	379.47	+	20.30	=	399.76
61 ML to 70 ML	356.35	+	19.12	=	375.47
71 ML to 80 ML	339.49	+	18.26	=	357.75
81 ML to 90 ML	326.65	+	17.61	=	344.26
91 ML to 100 ML	316.22	+	17.08	=	333.29
101 ML to 110 ML	308.14	+	16.65	=	324.78
111 ML to 120 ML	304.96	+	16.31	=	321.27
121 ML to 130 ML	302.08	+	16.01	=	318.09
131 ML to 140 ML	299.75	+	15.76	=	315.51
141 ML to 150 ML	297.50	+	15.53	=	313.03
151 ML to 160 ML	295.99	+	15.36	=	311.35
161 ML to 170 ML	294.49	+	15.19	=	309.68
171 ML to 180 ML	293.21	+	15.04	=	308.25
181 ML to 190 ML	292.38	+	14.92	=	307.31
191 ML to 200 ML	291.65	+	14.86	=	306.51
201 ML to 210 ML	291.65	+	14.86	=	306.51
211 ML to 220 ML	291.65	+	14.86	=	306.51
221 ML to 230 ML	291.65	+	14.86	=	306.51
231 ML to 240 ML	291.65	+	14.86	=	306.51
241 ML to 250 ML	291.65	+	14.86	=	306.51
251 ML to 260 ML	291.65	+	14.86	=	306.51
261 ML to 270 ML	291.65	+	14.86	=	306.51
271 ML to 280 ML	291.65	+	14.86	=	306.51

2020-21 Variable Charges

Weekly Plant Capacity	Peak Electricity Usage		Peak Network Rate		Peak Retail Rate		Shoulder Electricity Usage		Shoulder Network Rate		Shoulder Retail Rate		Off-peak Electricity Usage		Off-peak Retail Rate		Off-peak Network Rate		Variable Electricty Charge				Electricty Charge
	kWh per ML		Cents per kWh				kWh per ML		Cents per kWh				kWh per ML		Cents per kWh				Cents per ML				$ per ML
1 ML to 10 ML	1,745	X	[redacted]	+	[redacted]	+	3,490	X	[redacted]	+	[redacted]	+	8,223	X	[redacted]	+	[redacted]	=	177279.45	/	100	=	1772.79
11 ML to 20 ML	563	X		+		+	1,126	X		+		+	3,827	X		+		=	71562.00	/	100	=	715.62
21 ML to 30 ML	343	X		+		+	685	X		+		+	3,006	X		+		=	51836.57	/	100	=	518.37
31 ML to 40 ML	246	X		+		+	492	X		+		+	2,647	X		+		=	43196.97	/	100	=	431.97
41 ML to 50 ML	192	X		+		+	384	X		+		+	2,446	X		+		=	38365.19	/	100	=	383.65
51 ML to 60 ML	158	X		+		+	315	X		+		+	2,318	X		+		=	35290.72	/	100	=	352.91
61 ML to 70 ML	134	X		+		+	267	X		+		+	2,228	X		+		=	33135.11	/	100	=	331.35
71 ML to 80 ML	116	X		+		+	232	X		+		+	2,163	X		+		=	31563.55	/	100	=	315.64
81 ML to 90 ML	103	X		+		+	205	X		+		+	2,113	X		+		=	30366.07	/	100	=	303.66
91 ML to 100 ML	92	X		+		+	183	X		+		+	2,073	X		+		=	29393.37	/	100	=	293.93
101 ML to 110 ML	83	X		+		+	180	X		+		+	2,026	X		+		=	28641.29	/	100	=	286.41
111 ML to 120 ML	76	X		+		+	315	X		+		+	1,851	X		+		=	28361.97	/	100	=	283.62
121 ML to 130 ML	70	X		+		+	428	X		+		+	1,703	X		+		=	28107.50	/	100	=	281.07
131 ML to 140 ML	65	X		+		+	524	X		+		+	1,578	X		+		=	27901.74	/	100	=	279.02
141 ML to 150 ML	60	X		+		+	607	X		+		+	1,469	X		+		=	27702.47	/	100	=	277.02
151 ML to 160 ML	57	X		+		+	680	X		+		+	1,375	X		+		=	27570.76	/	100	=	275.71
161 ML to 170 ML	102	X		+		+	695	X		+		+	1,292	X		+		=	27438.92	/	100	=	274.40
171 ML to 180 ML	195	X		+		+	655	X		+		+	1,218	X		+		=	27329.17	/	100	=	273.29
181 ML to 190 ML	274	X		+		+	622	X		+		+	1,156	X		+		=	27259.85	/	100	=	272.60
191 ML to 200 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
201 ML to 210 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
211 ML to 220 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
221 ML to 230 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
231 ML to 240 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
241 ML to 250 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
251 ML to 260 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
261 ML to 270 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94
271 ML to 280 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27194.34	/	100	=	271.94

inclusive of any Distribution and Margin Loss Factors

2020-21 Variable Charges (continued)

Weekly Plant Capacity	Total Electricity Usage		Distribution Loss Factor		Environmental Charge Rates		Market Charge Rates		Other Variable Electricity Charge				Other Variable Electricity Charge
	kWh per ML		Unit		Cents per kWh				Cents per ML				$ per ML
1 ML to 10 ML	13,458	X	1.033	X	(0.600	+	0.052)	=	3068.12	/	100	=	30.68
11 ML to 20 ML	5,516	X	1.033	X	(0.600	+	0.052)	=	3716.73	/	100	=	37.17
21 ML to 30 ML	4,034	X	1.033	X	(0.600	+	0.052)	=	2718.15	/	100	=	27.18
31 ML to 40 ML	3,385	X	1.033	X	(0.600	+	0.052)	=	2280.84	/	100	=	22.81
41 ML to 50 ML	3,022	X	1.033	X	(0.600	+	0.052)	=	2036.25	/	100	=	20.36
51 ML to 60 ML	2,791	X	1.033	X	(0.600	+	0.052)	=	1880.60	/	100	=	18.81
61 ML to 70 ML	2,629	X	1.033	X	(0.600	+	0.052)	=	1771.44	/	100	=	17.71
71 ML to 80 ML	2,511	X	1.033	X	(0.600	+	0.052)	=	1691.93	/	100	=	16.92
81 ML to 90 ML	2,421	X	1.033	X	(0.600	+	0.052)	=	1631.29	/	100	=	16.31
91 ML to 100 ML	2,348	X	1.033	X	(0.600	+	0.052)	=	1582.10	/	100	=	15.82
101 ML to 110 ML	2,289	X	1.033	X	(0.600	+	0.052)	=	1542.35	/	100	=	15.42
111 ML to 120 ML	2,242	X	1.033	X	(0.600	+	0.052)	=	1510.68	/	100	=	15.11
121 ML to 130 ML	2,201	X	1.033	X	(0.600	+	0.052)	=	1483.05	/	100	=	14.83
131 ML to 140 ML	2,167	X	1.033	X	(0.600	+	0.052)	=	1460.14	/	100	=	14.60
141 ML to 150 ML	2,136	X	1.033	X	(0.600	+	0.052)	=	1439.26	/	100	=	14.39
151 ML to 160 ML	2,112	X	1.033	X	(0.600	+	0.052)	=	1423.09	/	100	=	14.23
161 ML to 170 ML	2,089	X	1.033	X	(0.600	+	0.052)	=	1407.59	/	100	=	14.08
171 ML to 180 ML	2,068	X	1.033	X	(0.600	+	0.052)	=	1393.44	/	100	=	13.93
181 ML to 190 ML	2,052	X	1.033	X	(0.600	+	0.052)	=	1382.66	/	100	=	13.83
191 ML to 200 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
201 ML to 210 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
211 ML to 220 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
221 ML to 230 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
231 ML to 240 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
241 ML to 250 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
251 ML to 260 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
261 ML to 270 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77
271 ML to 280 ML	2,043	X	1.033	X	(0.600	+	0.052)	=	1376.59	/	100	=	13.77

Weekly Plant Capacity	Electricity Charge		Other Variable Electricity Charge		Total Variable Electricity Charge
			$ per ML		
1 ML to 10 ML	1772.79	+	30.68	=	1,863.48
11 ML to 20 ML	715.62	+	37.17	=	752.79
21 ML to 30 ML	518.37	+	27.18	=	545.55
31 ML to 40 ML	431.97	+	22.81	=	454.78
41 ML to 50 ML	383.65	+	20.36	=	404.01
51 ML to 60 ML	352.91	+	18.81	=	371.71
61 ML to 70 ML	331.35	+	17.71	=	349.07
71 ML to 80 ML	315.64	+	16.92	=	332.55
81 ML to 90 ML	303.66	+	16.31	=	319.97
91 ML to 100 ML	293.93	+	15.82	=	309.75
101 ML to 110 ML	286.41	+	15.42	=	301.84
111 ML to 120 ML	283.62	+	15.11	=	298.73
121 ML to 130 ML	281.07	+	14.83	=	295.91
131 ML to 140 ML	279.02	+	14.60	=	293.62
141 ML to 150 ML	277.02	+	14.39	=	291.42
151 ML to 160 ML	275.71	+	14.23	=	289.94
161 ML to 170 ML	274.40	+	14.08	=	288.48
171 ML to 180 ML	273.29	+	13.93	=	287.23
181 ML to 190 ML	272.60	+	13.83	=	286.43
191 ML to 200 ML	271.94	+	13.77	=	285.71
201 ML to 210 ML	271.94	+	13.77	=	285.71
211 ML to 220 ML	271.94	+	13.77	=	285.71
221 ML to 230 ML	271.94	+	13.77	=	285.71
231 ML to 240 ML	271.94	+	13.77	=	285.71
241 ML to 250 ML	271.94	+	13.77	=	285.71
251 ML to 260 ML	271.94	+	13.77	=	285.71
261 ML to 270 ML	271.94	+	13.77	=	285.71
271 ML to 280 ML	271.94	+	13.77	=	285.71

2021-22 Variable Charges

Weekly Plant Capacity	Peak Electricity Usage		Peak Network Rate		Peak Retail Rate		Shoulder Electricity Usage		Shoulder Network Rate		Shoulder Retail Rate		Off-peak Electricity Usage		Off-peak Retail Rate		Off-peak Network Rate		Variable Electricty Charge				Electricty Charge
	kWh per ML		Cents per kWh				kWh per ML		Cents per kWh				kWh per ML		Cents per kWh				Cents per ML				$ per ML
1 ML to 10 ML	1,745	X	[redacted]	+	[redacted]	+	3,490	X	[redacted]	+	[redacted]	+	8,223	X	[redacted]	+	[redacted]	=	149680.93	/	100	=	1496.81
11 ML to 20 ML	563	X		+		+	1,126	X		+		+	3,827	X		+		=	60225.41	/	100	=	602.25
21 ML to 30 ML	343	X		+		+	685	X		+		+	3,006	X		+		=	43534.55	/	100	=	435.35
31 ML to 40 ML	246	X		+		+	492	X		+		+	2,647	X		+		=	36223.82	/	100	=	362.24
41 ML to 50 ML	192	X		+		+	384	X		+		+	2,446	X		+		=	32135.32	/	100	=	321.35
51 ML to 60 ML	158	X		+		+	315	X		+		+	2,318	X		+		=	29533.85	/	100	=	295.34
61 ML to 70 ML	134	X		+		+	267	X		+		+	2,228	X		+		=	27709.96	/	100	=	277.10
71 ML to 80 ML	116	X		+		+	232	X		+		+	2,163	X		+		=	26380.00	/	100	=	263.80
81 ML to 90 ML	103	X		+		+	205	X		+		+	2,113	X		+		=	25366.81	/	100	=	253.67
91 ML to 100 ML	92	X		+		+	183	X		+		+	2,073	X		+		=	24543.57	/	100	=	245.44
101 ML to 110 ML	83	X		+		+	180	X		+		+	2,026	X		+		=	23913.07	/	100	=	239.13
111 ML to 120 ML	76	X		+		+	315	X		+		+	1,851	X		+		=	23737.32	/	100	=	237.38
121 ML to 130 ML	70	X		+		+	428	X		+		+	1,703	X		+		=	23574.08	/	100	=	235.74
131 ML to 140 ML	65	X		+		+	524	X		+		+	1,578	X		+		=	23443.60	/	100	=	234.44
141 ML to 150 ML	60	X		+		+	607	X		+		+	1,469	X		+		=	23312.71	/	100	=	233.13
151 ML to 160 ML	57	X		+		+	680	X		+		+	1,375	X		+		=	23234.44	/	100	=	232.34
161 ML to 170 ML	102	X		+		+	635	X		+		+	1,292	X		+		=	23154.60	/	100	=	231.55
171 ML to 180 ML	195	X		+		+	655	X		+		+	1,218	X		+		=	23090.48	/	100	=	230.90
181 ML to 190 ML	274	X		+		+	622	X		+		+	1,156	X		+		=	23057.03	/	100	=	230.57
191 ML to 200 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
201 ML to 210 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
211 ML to 220 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
221 ML to 230 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
231 ML to 240 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
241 ML to 250 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
251 ML to 260 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
261 ML to 270 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11
271 ML to 280 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	23011.11	/	100	=	230.11

inclusive of any Distribution and Margin Loss Factors

2021-22 Variable Charges (continued)

Weekly Plant Capacity	Total Electricity Usage		Distribution Loss Factor		Environmental Charge Rates		Market Charge Rates		Other Variable Electricity Charge				Other Variable Electricity Charge
	kWh per ML		Unit		Cents per kWh				Cents per ML				$ per ML
1 ML to 10 ML	13,458	X	1.033	X	(0.553	+	0.052)	=	8405.33	/	100	=	84.05
11 ML to 20 ML	5,516	X	1.033	X	(0.553	+	0.052)	=	3445.07	/	100	=	34.45
21 ML to 30 ML	4,034	X	1.033	X	(0.553	+	0.052)	=	2519.48	/	100	=	25.19
31 ML to 40 ML	3,385	X	1.033	X	(0.553	+	0.052)	=	2114.14	/	100	=	21.14
41 ML to 50 ML	3,022	X	1.033	X	(0.553	+	0.052)	=	1887.42	/	100	=	18.87
51 ML to 60 ML	2,791	X	1.033	X	(0.553	+	0.052)	=	1743.15	/	100	=	17.43
61 ML to 70 ML	2,629	X	1.033	X	(0.553	+	0.052)	=	1641.97	/	100	=	16.42
71 ML to 80 ML	2,511	X	1.033	X	(0.553	+	0.052)	=	1568.27	/	100	=	15.68
81 ML to 90 ML	2,421	X	1.033	X	(0.553	+	0.052)	=	1512.06	/	100	=	15.12
91 ML to 100 ML	2,348	X	1.033	X	(0.553	+	0.052)	=	1466.47	/	100	=	14.66
101 ML to 110 ML	2,289	X	1.033	X	(0.553	+	0.052)	=	1429.62	/	100	=	14.30
111 ML to 120 ML	2,242	X	1.033	X	(0.553	+	0.052)	=	1400.26	/	100	=	14.00
121 ML to 130 ML	2,201	X	1.033	X	(0.553	+	0.052)	=	1374.66	/	100	=	13.75
131 ML to 140 ML	2,167	X	1.033	X	(0.553	+	0.052)	=	1353.42	/	100	=	13.53
141 ML to 150 ML	2,136	X	1.033	X	(0.553	+	0.052)	=	1334.06	/	100	=	13.34
151 ML to 160 ML	2,112	X	1.033	X	(0.553	+	0.052)	=	1319.07	/	100	=	13.19
161 ML to 170 ML	2,089	X	1.033	X	(0.553	+	0.052)	=	1304.71	/	100	=	13.05
171 ML to 180 ML	2,068	X	1.033	X	(0.553	+	0.052)	=	1291.59	/	100	=	12.92
181 ML to 190 ML	2,052	X	1.033	X	(0.553	+	0.052)	=	1281.60	/	100	=	12.82
191 ML to 200 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
201 ML to 210 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
211 ML to 220 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
221 ML to 230 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
231 ML to 240 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
241 ML to 250 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
251 ML to 260 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
261 ML to 270 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76
271 ML to 280 ML	2,043	X	1.033	X	(0.553	+	0.052)	=	1275.98	/	100	=	12.76

Weekly Plant Capacity	Electricity Charge		Other Variable Electricity Charge		Total Variable Electricity Charge
	$ per ML				
1 ML to 10 ML	1496.81	+	84.05	=	1,580.86
11 ML to 20 ML	602.25	+	34.45	=	636.70
21 ML to 30 ML	435.35	+	25.19	=	460.54
31 ML to 40 ML	362.24	+	21.14	=	383.38
41 ML to 50 ML	321.35	+	18.87	=	340.23
51 ML to 60 ML	295.34	+	17.43	=	312.77
61 ML to 70 ML	277.10	+	16.42	=	293.52
71 ML to 80 ML	263.80	+	15.68	=	279.48
81 ML to 90 ML	253.67	+	15.12	=	268.79
91 ML to 100 ML	245.44	+	14.66	=	260.10
101 ML to 110 ML	239.13	+	14.30	=	253.43
111 ML to 120 ML	237.38	+	14.00	=	251.38
121 ML to 130 ML	235.74	+	13.75	=	249.49
131 ML to 140 ML	234.44	+	13.53	=	247.97
141 ML to 150 ML	233.13	+	13.34	=	246.47
151 ML to 160 ML	232.34	+	13.19	=	245.54
161 ML to 170 ML	231.55	+	13.05	=	244.59
171 ML to 180 ML	230.90	+	12.92	=	243.82
181 ML to 190 ML	230.57	+	12.82	=	243.39
191 ML to 200 ML	230.11	+	12.76	=	242.87
201 ML to 210 ML	230.11	+	12.76	=	242.87
211 ML to 220 ML	230.11	+	12.76	=	242.87
221 ML to 230 ML	230.11	+	12.76	=	242.87
231 ML to 240 ML	230.11	+	12.76	=	242.87
241 ML to 250 ML	230.11	+	12.76	=	242.87
251 ML to 260 ML	230.11	+	12.76	=	242.87
261 ML to 270 ML	230.11	+	12.76	=	242.87
271 ML to 280 ML	230.11	+	12.76	=	242.87

2022-23 Variable Charges

Weekly Plant Capacity	Peak Electricity Usage		Peak Network Rate		Peak Retail Rate		Shoulder Electricity Usage		Shoulder Network Rate		Shoulder Retail Rate		Off-peak Electricity Usage		Off-peak Retail Rate		Off-peak Network Rate		Variable Electricty Charge				Electricty Charge
	kWh per ML		Cents per kWh				kWh per ML		Cents per kWh				kWh per ML		Cents per kWh				Cents per ML				$ per ML
1 ML to 10 ML	1,745	X	[redacted]	+	[redacted]	+	3,490	X	[redacted]	+	[redacted]	+	8,223	X	[redacted]	+	[redacted]	=	175380.08	/	100	=	1753.80
11 ML to 20 ML	563	X		+		+	1,126	X		+		+	3,827	X		+		=	69453.13	/	100	=	694.53
21 ML to 30 ML	343	X		+		+	685	X		+		+	3,006	X		+		=	43697.74	/	100	=	436.98
31 ML to 40 ML	246	X		+		+	492	X		+		+	2,647	X		+		=	41040.84	/	100	=	410.41
41 ML to 50 ML	192	X		+		+	384	X		+		+	2,446	X		+		=	36199.36	/	100	=	362.00
51 ML to 60 ML	158	X		+		+	315	X		+		+	2,318	X		+		=	33119.39	/	100	=	331.20
61 ML to 70 ML	134	X		+		+	267	X		+		+	2,228	X		+		=	30961.18	/	100	=	309.61
71 ML to 80 ML	116	X		+		+	232	X		+		+	2,163	X		+		=	29385.69	/	100	=	293.86
81 ML to 90 ML	103	X		+		+	205	X		+		+	2,113	X		+		=	28186.43	/	100	=	281.86
91 ML to 100 ML	92	X		+		+	183	X		+		+	2,073	X		+		=	27210.69	/	100	=	272.11
101 ML to 110 ML	83	X		+		+	180	X		+		+	2,026	X		+		=	26498.71	/	100	=	264.99
111 ML to 120 ML	76	X		+		+	315	X		+		+	1,851	X		+		=	26650.41	/	100	=	266.50
121 ML to 130 ML	70	X		+		+	428	X		+		+	1,703	X		+		=	26758.41	/	100	=	267.58
131 ML to 140 ML	65	X		+		+	524	X		+		+	1,578	X		+		=	26853.82	/	100	=	268.60
141 ML to 150 ML	60	X		+		+	607	X		+		+	1,469	X		+		=	26926.21	/	100	=	269.26
151 ML to 160 ML	57	X		+		+	680	X		+		+	1,375	X		+		=	27028.04	/	100	=	270.28
161 ML to 170 ML	102	X		+		+	695	X		+		+	1,292	X		+		=	27100.34	/	100	=	271.00
171 ML to 180 ML	195	X		+		+	655	X		+		+	1,218	X		+		=	27169.72	/	100	=	271.70
181 ML to 190 ML	274	X		+		+	622	X		+		+	1,156	X		+		=	27253.95	/	100	=	272.54
191 ML to 200 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
201 ML to 210 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
211 ML to 220 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
221 ML to 230 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
231 ML to 240 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
241 ML to 250 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
251 ML to 260 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
261 ML to 270 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46
271 ML to 280 ML	304	X		+		+	608	X		+		+	1,131	X		+		=	27246.19	/	100	=	272.46

inclusive of any Distribution and Margin Loss Factors

2022-23 Variable Charges (continued)

Weekly Plant Capacity	Total Electricity Usage		Distribution Loss Factor		Environmental Charge Rates		Market Charge Rates		Other Variable Electricity Charge				Other Variable Electricity Charge
	kWh per ML		Unit		Cents per kWh				Cents per ML				$ per ML
1 ML to 10 ML	13,458	X	1.033	X	(0.509	+	0.052)	=	7790.93	/	100	=	77.91
11 ML to 20 ML	5,516	X	1.033	X	(0.509	+	0.052)	=	3193.25	/	100	=	31.93
21 ML to 30 ML	4,034	X	1.033	X	(0.509	+	0.052)	=	2335.31	/	100	=	23.35
31 ML to 40 ML	3,385	X	1.033	X	(0.509	+	0.052)	=	1959.60	/	100	=	19.60
41 ML to 50 ML	3,022	X	1.033	X	(0.509	+	0.052)	=	1749.46	/	100	=	17.49
51 ML to 60 ML	2,791	X	1.033	X	(0.509	+	0.052)	=	1615.73	/	100	=	16.16
61 ML to 70 ML	2,629	X	1.033	X	(0.509	+	0.052)	=	1521.95	/	100	=	15.22
71 ML to 80 ML	2,511	X	1.033	X	(0.509	+	0.052)	=	1453.64	/	100	=	14.54
81 ML to 90 ML	2,421	X	1.033	X	(0.509	+	0.052)	=	1401.53	/	100	=	14.02
91 ML to 100 ML	2,348	X	1.033	X	(0.509	+	0.052)	=	1359.27	/	100	=	13.59
101 ML to 110 ML	2,289	X	1.033	X	(0.509	+	0.052)	=	1325.12	/	100	=	13.25
111 ML to 120 ML	2,242	X	1.033	X	(0.509	+	0.052)	=	1297.91	/	100	=	12.98
121 ML to 130 ML	2,201	X	1.033	X	(0.509	+	0.052)	=	1274.17	/	100	=	12.74
131 ML to 140 ML	2,167	X	1.033	X	(0.509	+	0.052)	=	1254.49	/	100	=	12.54
141 ML to 150 ML	2,136	X	1.033	X	(0.509	+	0.052)	=	1236.55	/	100	=	12.37
151 ML to 160 ML	2,112	X	1.033	X	(0.509	+	0.052)	=	1222.65	/	100	=	12.23
161 ML to 170 ML	2,089	X	1.033	X	(0.509	+	0.052)	=	1209.34	/	100	=	12.09
171 ML to 180 ML	2,068	X	1.033	X	(0.509	+	0.052)	=	1197.18	/	100	=	11.97
181 ML to 190 ML	2,052	X	1.033	X	(0.509	+	0.052)	=	1187.92	/	100	=	11.88
191 ML to 200 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
201 ML to 210 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
211 ML to 220 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
221 ML to 230 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
231 ML to 240 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
241 ML to 250 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
251 ML to 260 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
261 ML to 270 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83
271 ML to 280 ML	2,043	X	1.033	X	(0.509	+	0.052)	=	1182.71	/	100	=	11.83

Weekly Plant Capacity	Electricity Charge		Other Variable Electricity Charge		Total Variable Electricity Charge
			$ per ML		
1 ML to 10 ML	1753.80	+	77.91	=	1,831.71
11 ML to 20 ML	694.59	+	31.93	=	726.52
21 ML to 30 ML	496.98	+	23.35	=	520.33
31 ML to 40 ML	410.41	+	19.60	=	430.00
41 ML to 50 ML	362.00	+	17.49	=	379.49
51 ML to 60 ML	331.20	+	16.16	=	347.36
61 ML to 70 ML	309.61	+	15.22	=	324.83
71 ML to 80 ML	293.86	+	14.54	=	308.39
81 ML to 90 ML	281.86	+	14.02	=	295.88
91 ML to 100 ML	272.11	+	13.59	=	285.70
101 ML to 110 ML	264.99	+	13.25	=	278.24
111 ML to 120 ML	266.50	+	12.98	=	279.48
121 ML to 130 ML	267.58	+	12.74	=	280.33
131 ML to 140 ML	268.60	+	12.54	=	281.14
141 ML to 150 ML	269.26	+	12.37	=	281.63
151 ML to 160 ML	270.28	+	12.23	=	282.51
161 ML to 170 ML	271.00	+	12.09	=	283.10
171 ML to 180 ML	271.70	+	11.97	=	283.67
181 ML to 190 ML	272.54	+	11.88	=	284.42
191 ML to 200 ML	272.46	+	11.83	=	284.29
201 ML to 210 ML	272.46	+	11.83	=	284.29
211 ML to 220 ML	272.46	+	11.83	=	284.29
221 ML to 230 ML	272.46	+	11.83	=	284.29
231 ML to 240 ML	272.46	+	11.83	=	284.29
241 ML to 250 ML	272.46	+	11.83	=	284.29
251 ML to 260 ML	272.46	+	11.83	=	284.29
261 ML to 270 ML	272.46	+	11.83	=	284.29
271 ML to 280 ML	272.46	+	11.83	=	284.29

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