Attachment 3

Service standards

30 June 2017

2018–23 Water and Sewerage Price Proposal

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1 Summary

This attachment sets out Icon Water's approach to service levels in the 2018–23 regulatory period.

Many of the ways in which we provide water and sewerage services are regulated by technical and environmental authorities. However, Icon Water does have discretion over some aspects of its service levels.

Icon Water has outperformed almost all of the key service targets it set at the 2013–18 price review and has maintained strong performance throughout the period. There is a high level of satisfaction among our customers, we now have a high level of water security and the quality of the drinking water our customers enjoy has been recognised with the Best Tasting Water award for ACT/NSW at the 2017 Water Industry Operators Association of Australia conference.

When planning for the 2018–23 regulatory period, we need to make decisions about what service levels we will target, taking into consideration the expenditure required and the impact that expenditure would have on customer bills over time.

Network reliability and price are two of the main customer priorities identified in the market research undertaken as part of our community engagement program. We conducted several pieces of targeted research in order to strike a better balance between those two priorities for customers. This research program included:

- a stated preference study in partnership with Professor Riccardo Scarpa (see Appendix 1)
- development of water mains renewal options by WISER Analysis
- an award-winning project developing sewer maintenance options by AECOM and SEAMS.[1]

The results of these studies were used in a benefit-cost analysis from a whole-of-community standpoint of a range of network expenditure options by the Centre for International Economics (CIE). The analysis concluded that customers do not want us to spend more than we currently do to reduce the risk of water supply interruptions and sewage overflows. It found that customers would prefer us to spend less on water mains renewal, which would lead to reduced bills and a marginal increase in the number of water supply interruptions over time.

In response to this finding, we propose a measured reduction in expenditure on water mains renewal. Our target performance in relation to water supply interruptions remains significantly better than the Australian water industry average. Following further discussion with our customers about the equity impacts of reducing this expenditure, we may propose further reductions from 2023.

Icon Water's service targets for the 2018–23 regulatory period generally involve maintaining the levels delivered over the past five years. Icon Water will continue to review its service levels with customers during the 2018–23 regulatory period.

[1] This project was awarded the AMCouncil Asset Management Award 2017 in the category for Asset Management Cost/Risk/Performance. The award recognises excellence in the management of physical assets through their life cycle and showcases use of best practice Asset Management systems and processes.

Box 1-1: Key points

- Icon Water has performed strongly on service levels during the 2013–18 regulatory period.
- We have conducted research to help us strike a balance between cost and service levels that reflects customer preferences.
- The research found that customers want us to maintain but not increase proactive sewer maintenance.
- The research found that customers would prefer us to spend less on water mains renewal. Customers would prefer to see a small increase in the number of unplanned water supply interruptions over time and have more money in their pocket.
- Generally, Icon Water proposes to maintain the service levels delivered in the 2013–18 regulatory period.

2 Our service performance

2.1 Introduction

Along with price, service performance is one of the outcomes from Icon Water's decision making that customers care most about. Service performance is reflected in the overarching objective for this price review, set out in s19L of the *Independent Competition and Regulatory Commission Act 1997* (ICRC Act):

> To promote efficient investment in, and efficient operation and use of, regulated services for the long-term interests of consumers in relation to the price, quality, safety, reliability and security of the service (emphasis added).

The Independent Competition and Regulatory Commission (ICRC) is also required to have regard to 'standards of quality, reliability and safety of the regulated services.'[2]

2.2 Measures

Icon Water's service performance is measured in several different ways, including regulatory obligations, external performance reporting, and customer satisfaction surveys. Each of these measures is discussed briefly below.

2.2.1 Regulatory obligations

Many aspects of the way in which Icon Water operates and the services we provide to the community are regulated by the ACT Government and the Australian Government. Some of the most substantial obligations include compliance with the *Utility Services Licence* under the *Utilities Act 2000* (ACT), compliance with the *Drinking Water Utility Licence* (and *Australian Drinking Water Quality Guidelines 2011*), the *Consumer Protection Code July 2012,* technical codes under *Utilities (Technical Regulation) Act 2014* (ACT) and legislative instruments under the *Environment Protection Act 1997* (ACT). Compliance with these obligations is a substantial driver of the costs Icon Water incurs in constructing, operating and maintaining its infrastructure.

The Utilities Technical Regulator (UTR) is currently reviewing the technical codes that apply to Icon Water. This review is expected to be completed by early 2018. The evidence and proposals in this attachment, particularly the customer engagement findings, will be discussed with the UTR as part of this process. Many of the measures reported to the UTR are technical in nature and Icon Water will continue to assess whether the measures could be revised to better reflect the outcomes that customers care about.

2.2.2 External reporting

Icon Water reports on specific service level measures to the ICRC, the UTR, the Bureau of Meteorology and the Australian Bureau of Statistics. These measures include the number and type of customer complaints and the number and duration of planned and unplanned interruptions to water supply and sewerage services.

[2] ACT Government, 1997: s20(2)(b).

Icon Water also reports on a range of performance indicators to its shareholders in the *Statement of Corporate Intent* (SCI) and to authorities administering the regulatory obligations outlined above, including ACT Health and the ACT and NSW environment protection authorities.

2.2.3 Customer satisfaction surveys

Icon Water undertakes periodic telephone surveys to measure customer satisfaction with its services.

2.3 Performance in the 2013–18 regulatory period

Icon Water has performed strongly over the past five years, meeting or outperforming almost all of the key service delivery targets proposed in its 2013–18 regulatory proposal.[3]

2.3.1 Indicators of overall performance

Icon Water's strong performance is reflected in the fact that we have outperformed, by a considerable margin, our target for total water and sewerage complaints (see Table 2-1).

Table 2-1: Total water and sewerage complaints

	Target 2013–18	2011-12	2012-13	2013-14	2014-15	2015-16
Total water and sewerage complaints (per 1,000 properties)	5.4–7.5	5.0	4.8	4.0	4.3	3.8

Source: Bureau of Meteorology (2017); ACTEW (2012): 64–65.

The proportion of customers indicating overall satisfaction with our service has remained above 80 per cent, with only two to three per cent of survey respondents indicating they are dissatisfied with Icon Water's services (see Table 2-2).

Table 2-2: Reported overall customer satisfaction

	2010	2011	2012	2015	2016
Sample size	272	272	272	500	1,000
How satisfied are you with ActewAGL's water service? (per cent 'satisfied')	93%	87%	84%		
How satisfied are you with ActewAGL's sewerage service? (per cent 'satisfied')	94%	91%	85%		
Considering everything, how satisfied are you with Icon Water's service?					
Per cent 'satisfied' or 'very satisfied'				92%	82%
Per cent 'neither satisfied nor unsatisfied'				5%	16%

Source: Surveys of Icon Water customers by ORIMA Research and ACT Government Canberra Omnibus Survey.

[3] ACTEW, 2012: 64–65.

The primary reason for customers indicating dissatisfaction has been the price of water. Some of these customers also told us we could improve the clarity of bills and flexibility of payment methods. We improved the format of bills at the time of the Icon Water rebranding in 2015 and there are now eight payment methods available to our customers. We remain committed to improving our customers' experience with our services over time.

2.3.2 Drinking water quality

The high quality of the drinking water that our customers enjoy has been recognised by the Best Tasting Water award for ACT/NSW at the 2017 Water Industry Operators Association of Australia conference. We have outperformed our target for complaints relating to water quality and maintained 100 per cent microbiological compliance (see Table 2-3).

Table 2-3: Selected water quality performance measures

	Target 2013–18	2011-12	2012-13	2013-14	2014-15	2015-16
Water quality complaints (per 1,000 properties)	1.5–2.8	0.9	0.8	1.1	1.2	1.1
Drinking water: population where microbiological compliance was achieved (%)	100	100	100	100	100	100

Source: Bureau of Meteorology (2017); ACTEW (2012): 64–65.

2.3.3 Customer service

Icon Water has outperformed the challenging target we set ourselves in 2012 in relation to billing and account complaints (see Table 2-4). Around 70 per cent of calls have been answered by a human operator within 30 seconds.

Table 2-4: Selected customer service performance measures

	Target 2013–18	2011-12	2012-13	2013-14	2014-15	2015-16
Billing and account complaints - water and sewerage (per 1,000 properties)	0.2–1.1	0.2	0.1	0.1	0.1	0.1
Calls answered by an operator within 30 seconds (%)	N/A	N/A	72.5	79.1	71.3	66.7

Source: Bureau of Meteorology (2017); ACTEW (2012): 64–65.

2.3.4 Service reliability

Water supply in the ACT is now highly secure, with more than 240 gigalitres (GL) in storage. This volume is greater than the total storage capacity in place prior to the construction of the Enlarged Cotter Dam. Our modelling indicates that, if the weather conditions of the Millennium Drought occurred again now, storage levels would remain above 50 per cent and temporary water restrictions would not be triggered under the current scheme (see Attachment 4: Demand forecasts, section 2.2.1).

Icon Water has met or outperformed the key service delivery targets proposed in its 2013–18 regulatory proposal, with the exception of the average duration of unplanned water supply interruptions (for which the calculation method was changed shortly after the targets had been proposed). In particular, Icon Water has outperformed, by a considerable margin, its targets for frequency of water supply interruptions and sewerage mains breaks and chokes. Selected measures of Icon Water's service performance over the period 2011–2016 are set out in Table 2-5, along with the applicable targets we set for the 2013–18 period.

Table 2-5: Selected service reliability performance measures

	Target 2013–18 (c)	2011-12	2012-13	2013-14	2014-15	2015-16
Water service complaints (per 1,000 properties) (a)	0.8–2.6	2.0	2.1	1.3	1.3	1.5
Sewerage service complaints (no per 1,000 properties) (a)	0.9–2.6	1.4	1.2	0.9	1.3	1.1
Average frequency of unplanned interruptions - water (no per 1,000 properties) (a)	116–126	62.5	113.2	71.9	85.1	86.1
Average duration of an unplanned interruption - water (minutes) (a)	111–112	118.5	147.9	104.0	119.5	135.0
Planned interruptions to water supply (b)	N/A	6,811	3,893	880	2,555	16,931
Average planned water supply interruption duration (b)	N/A	19	14	39	19	23
Water main breaks (per 100km of main)	27–39	24.7	20.0	11.5	14.2	13.8
Unplanned interruptions to sewerage services (b)	N/A	1,266	1,197	1634	1,561	1,697
Average sewerage interruption (minutes) (a)	38–44	37	42	38	35	34
Sewerage mains breaks and chokes (per 100km of main)	<85	42	42	57	52	54

Source: (a) Bureau of Meteorology (2017); (b) ICRC annual reports; (c) ACTEW (2012): 64–65.

Generally, the trend in performance has been stable over the period. Unplanned water service interruptions vary from year to year with weather conditions, but the trend is stable. Sewerage service interruptions were abnormally low in 2011–2013, with the higher figures in 2013–2016 still well below the levels experienced during the drought. The number of planned water supply interruptions varies significantly over time depending on meter replacement activities being undertaken by Icon Water.

2.3.5 Environmental sustainability

We have reduced our carbon emissions per customer year on year throughout the period and we continue to treat effluent to a high standard prior to discharge into the river system (see Table 2-6). We are in the process of incorporating a sustainability infrastructure scorecard into 100 per cent of capital projects over $50,000. Our waste to landfill is reducing year on year and we continue to comply with environmental flow requirements, environmental authorisations and agreements.

Table 2-6: Selected environmental performance measures

	Target 2013–18	2011-12	2012-13	2013-14	2014-15	2015-16
Total net greenhouse gas emissions (net tonnes CO2-equivalents per 1,000 properties)	N/A	313	288	260	257	255
Sewage treated to a tertiary or advanced level (%)	N/A	100	100	100	100	100

Source: Bureau of Meteorology (2017); ACTEW (2012): 64–65.

3 Customer engagement on service levels

Icon Water is continually reviewing aspects of our service performance with respect to customer preferences. Icon Water has been a leader among Australian utilities in applying stated preference research to decision making, with research undertaken by NERA and AC Nielsen in 2003 used in the benefit-cost analysis of water security options submitted as part of the 2008–13 price review (CIE 2005) and benefit-cost analysis of the sewer maintenance program submitted as part of the 2013–18 price review.[4] In addition, the stated preference research undertaken by McNair and Ward (2012) has been used to optimise Icon Water's water supply source operating rules in order to reflect customer preferences with respect to the trade-off between water security and cost (see Purves et al 2015).

As part of developing this price proposal, Icon Water:

- talked to customers about their priorities in terms of outcomes
- conducted stated preference research to understand the trade-offs customers are willing to make between price and specified service outcomes
- conducted engineering modelling to understand ways in which we can rebalance price and service outcomes
- analysed the customer research and engineering modelling together to identify the asset management activities and expenditure that strike the best balance between price and service from customers' perspective
- revised our forecast asset management activities and expenditure, taking the results of our analysis along with other factors into consideration.

Each of these steps is discussed in this section.

3.1 Customer priorities

In September 2015, Icon Water worked with ORIMA Research to conduct a telephone survey of 500 of our residential, business and large water-user customers. Early in the survey, without prompting, respondents were asked "*What are the five most important aspects of Icon Water's service to you?*" The most commonly identified priorities are set out in Table 3-1. The five most common broad types of customer priority were quality drinking water, network reliability, fair and affordable pricing, customer service and environmental sustainability.

Other priorities identified in the research included onsite service, emerging technologies and community activities.

[4] ACTEW, 2012: Attachment 13.

Table 3-1: Most common unprompted customer priorities

Service attribute	Proportion of customers unprompted reporting attribute amongst five most important		
	Residential (n=300)	Business (n=166)	Large business (n=34)
Reliability			
Reliability of water supply	68%	67%	50%
Rapid response to problems	13%	17%	41%
Reliability of sewerage infrastructure	16%	8%	9%
Sufficient water resources	8%	0%	6%
Quality of drinking water			
Safe drinking water	65%	48%	35%
Taste	36%	25%	21%
No discolouration	24%	12%	9%
Pricing			
Affordable pricing	15%	10%	12%
Fair pricing	15%	7%	3%
Customer interface			
Billing (clarity, accuracy, etc.)	6%	5%	9%
Call centre service	4%	5%	6%

Source: ORIMA Research survey results, provided to Icon Water September 2015.

3.2 Water supply interruptions and sewage overflows

Our customer priority research indicated that network reliability and fair pricing are two of the three highest priorities for our customers. However, Icon Water is faced with a trade-off between these two priorities. Icon Water could spend more on improving network reliability, but this would increase prices. We could reduce prices by spending less on maintaining our infrastructure, but our services would become less reliable over time. We undertook further work to understand how customers want us to balance these two priorities. The network reliability outcomes we chose to focus on as part of these studies were the nature and frequency of water supply interruptions and sewage overflows.

Water supply interruptions

Sometimes, Icon Water needs to turn off mains water supply in order to undertake work on the water network, such as replacing water meters. Customers receive at least two days written notice of these planned interruptions.

On other occasions, water supply may need to be turned off without notice (an unplanned interruption) due to an unexpected fault. For example, a water main may burst due to wear and tear or

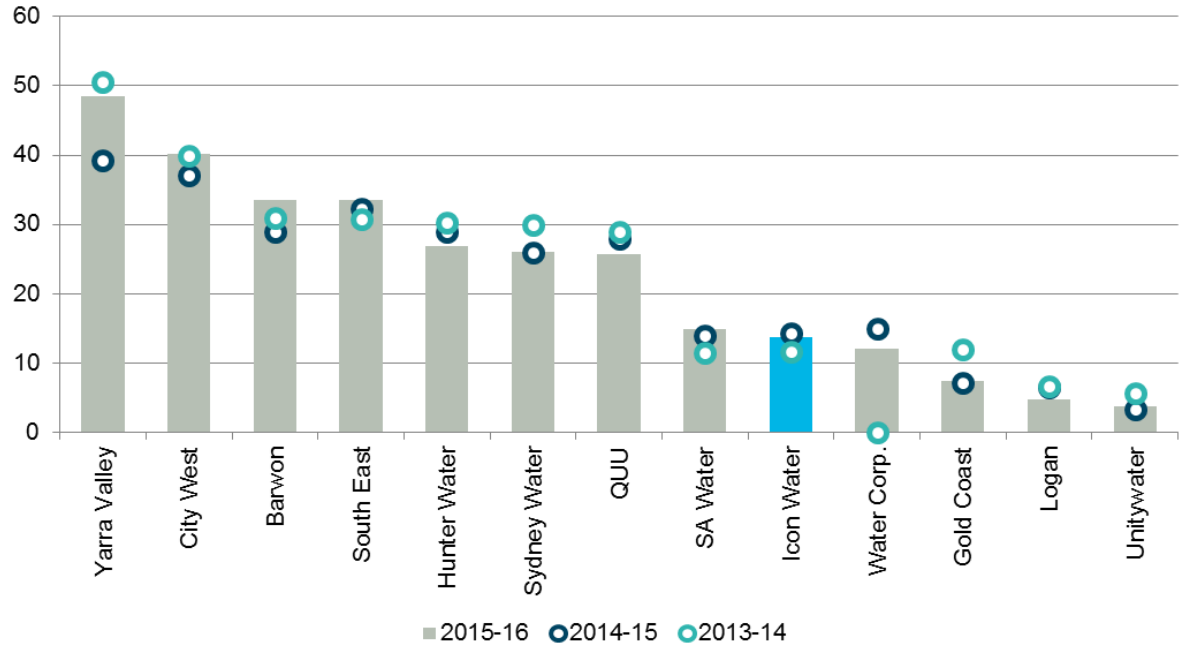
increased pressure in the water supply network and Icon Water will need to turn off supply to some customers in order to repair or replace the damaged pipe.

While the water supply is turned off, customers are not able to get water from the taps on their property (except where water is supplied from other sources such as a water tank).

In the event of an unplanned supply interruption, information on the estimated time to restore supply is provided on the Icon Water website and on the Icon Water faults and emergencies phone line.

The frequency of water main bursts in Icon Water's network is below-average when compared to other major Australian water utilities (see Figure 3-1).

Figure 3-1: Water main breaks per 100 km of water main



Source: Bureau of Meteorology (2017).

Icon Water can undertake activities to reduce the risk of water supply interruptions, including:

- installing more pressure-reducing valves in the water network
- replacing ageing pipes.

Icon Water can also reduce the time taken to restore water supply by increasing the number of crews undertaking works during planned interruptions and repairing burst mains during unplanned interruptions.

All of these activities come at a cost that is ultimately recovered in Icon Water bills paid by customers. The purpose of our research was to discover customers' views on how we should balance cost against the risk of water supply interruptions.

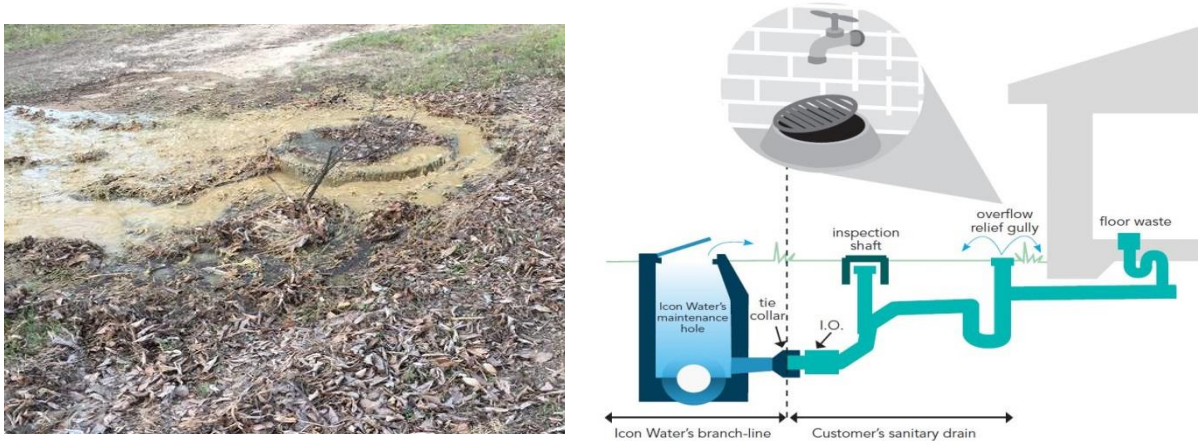
Sewage overflows

Sometimes, the pipes that carry sewage away from customers' properties become blocked due to pipe breakage, incursion of tree roots or incorrect disposal of waste (such as cooking grease or baby wipes). The blockage will cause sewage to build up in the pipe until it overflows from a manhole or an overflow relief gully.

Manholes are placed every 50 to 150 metres along sewer pipes. Most households have a manhole either on their property or nearby in their street. Overflow relief gullies are typically situated

immediately outside of buildings. They provide a point of release to prevent sewage from overflowing indoors.

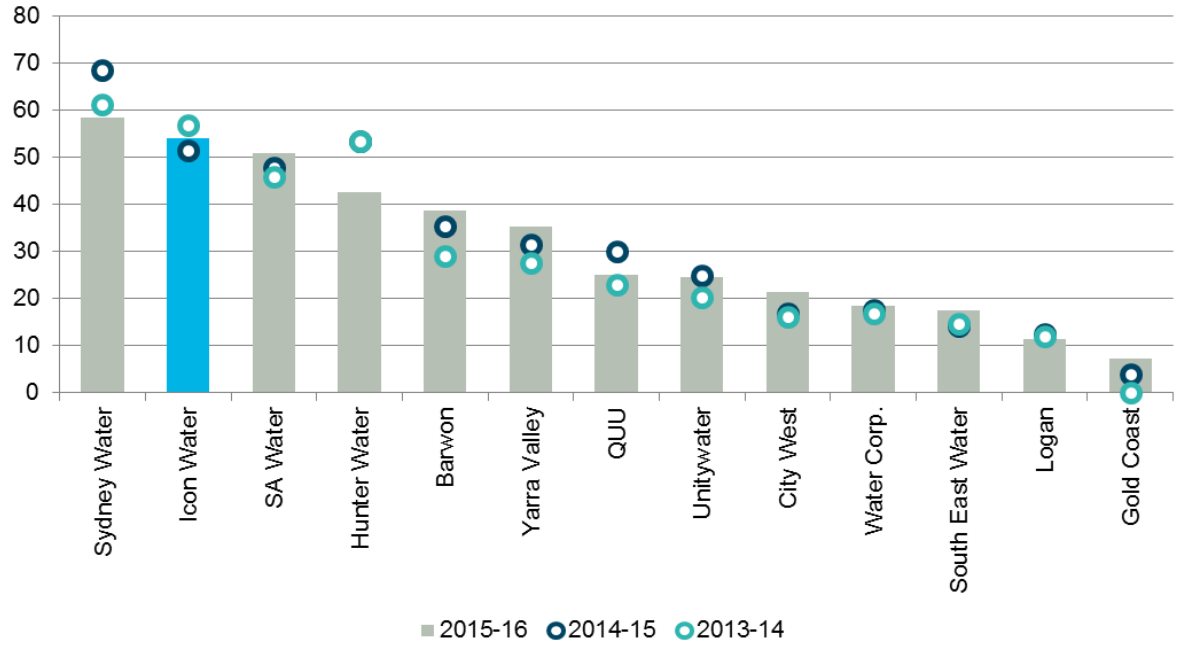
Figure 3-2: Sewage overflows



Sewage is 99.7 per cent water, but the 0.3 per cent of dissolved and suspended matter can contain many micro-organisms, such as viruses, bacteria, fungal, and parasitic organisms, that may be harmful to humans, animals and the environment. In the event of an overflow, customers need to keep away from the affected area until the blockage has been cleared and the area has been thoroughly cleaned and disinfected by Icon Water staff. There may be an odour from the sewage, which is unpleasant, but not a health risk itself.

The frequency of breaks and chokes in Icon Water's sewerage mains is high compared to other major Australian water utilities (see Figure 3-3). This result is driven to a significant extent by the clay soils in Canberra, which expand and contract with rainfall conditions, causing damage to pipes, and the relatively low rainfall in Canberra, which leads to tree root incursion.

Figure 3-3: Sewerage main breaks and chokes per 100 km of sewerage main



Source: Bureau of Meteorology (2017).

Icon Water can undertake activities to reduce the risk of sewer blockages, including:

- putting cameras down pipes to monitor their condition
- replacement of ageing pipes
- cleaning pipes.

Icon Water can also reduce the time taken to unblock sewers and clean up overflows by increasing the number of crews trained and made available to undertake this work.

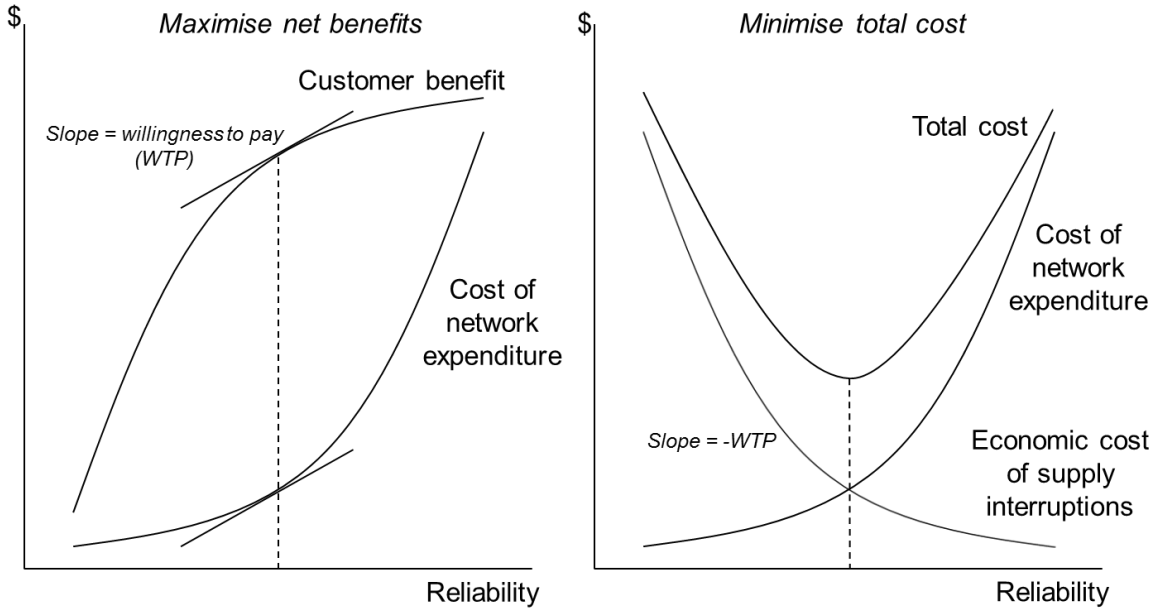
All of these activities come at a cost that is ultimately recovered in Icon Water bills paid by customers. The purpose of our research was to discover customers' views on how we should balance cost against the risk of sewer overflows.

3.3 Striking a balance

Figure 3-4 shows that striking the balance between these priorities can be characterised as maximising net benefits to the community or, equivalently, as minimising the total social costs of expenditure and service failures. In order to evaluate potential network management options within this framework, we needed to understand:

- the benefit or lost benefit to customers when reliability changes
- the network expenditure levels corresponding to different levels of reliability.

Figure 3-4: Two ways of characterising the trade-off between price and network reliability



3.4 Customer willingness to pay

Icon Water partnered with Professor Riccardo Scarpa, an international authority on stated preference techniques, to conduct a study estimating the benefits to Canberra households from changes in the nature and frequency of water supply interruptions and sewage overflows. Benefits are measured as the dollar changes in households' water and sewerage bills that they would be willing to trade for specified changes in service performance. The research considered both improvements and deterioration in service

"If I have had water interruptions in the last 20 years and statistically I must have, they had no impact on me."

performance and estimated separate values for:

- Willingness to pay (WTP) – the maximum bill increase households would be willing to pay for a specified service improvement.
- Willingness to accept (WTA) – the minimum bill decrease households would be willing to accept as compensation for a specified service degradation.

"*As much notice as possible of any interruptions is the most important issue - and also, other than shift workers, I think that late night/very early morning interruptions can be managed by most people*."

The detail of the research method and results are set out in a separate report at Appendix 1. A short summary is provided below.

The study used the choice modelling technique in which survey respondents are presented with choices between sets of scenarios described in terms of the frequency and duration of different types of service failures and the change in the customer bill. The scenarios vary across questions and respondents in such a way that respondents' choices reveal the value they place on various aspects of service. An example of a choice question from the sewerage survey is at Figure 3-5.

The answers to 3,854 choice questions given by 546 residential customers were analysed using statistical models to derive the estimates of the values placed on changes in service set out in Table 3-2 and Table 3-3. Confidence in these estimates as meaningful measures of customer value is supported by:

"*Mishaps and blockages are expected as Canberra is growing so fast these days. It's having the right staff to help that matters.*"

- the use of best-practice survey design and estimation methods
- consistency of key findings across many model specifications
- evidence from model estimation and debriefing questions indicating respondents included in the final sample found the price-service alternatives in the survey instruments to be realistic and gave careful consideration to the relevant trade-offs when stating their preferences
- consistency of results in many respects with prior expectations and the 2003 study by NERA and AC Nielsen.

Figure 3-5: Example of a choice question in the sewerage survey

	Current package	Package A	Package B
Sewerage service reliability			
Number of customers experiencing a sewer overflow on their property each year	3%	1%	5%
Number of customers experiencing a sewer overflow on their street or in nearby public land each year	6%	8%	8%
Average time taken to stop an overflow and clean the affected area	2 hours 30 minutes	4 hours	1 hour 30 minutes
The cost to you			
Permanent change in your annual Icon Water bill	$0	$10	-$50
If these were the only three options available to you, which option would you choose?	●	●	●
If Package A and Package B were the only two options available to you, which option would you choose?		●	●

Source: Icon Water and University of Waikato 2017 (see Appendix 1).

Table 3-2: Average WTP and WTA for specified changes in water network reliability

	Service improvement (WTP) **($ per annum)** 95 per cent confidence intervals in parentheses	**Service degradation (WTA)** **($ per annum)** 95 per cent confidence intervals in parentheses
One minute change in expected time off supply (probability x duration) due to planned supply interruptions taking place during business hours each year	**$2.53** ($0.58, $4.48)	**-$4.78** (-$8.42, -$1.14)
One percentage point change in the number of customers experiencing an unplanned water supply interruption each year	**$1.85** ($1.05, $2.65)	**-$3.49** (-$4.91, -$2.07)
One hour change in the duration of unplanned water supply interruptions	**$9.73** ($6.62, $12.85)	**-$18.38** (-$24.28, -$12.48)

Source: Icon Water and University of Waikato 2017 (see Appendix 1).

In addition to the values themselves, two key findings which had a significant impact on the subsequent benefit-cost analysis were:

- households place a much higher value on avoiding sewage overflows than on avoiding water supply interruptions
- household WTP for service improvement is lower than the compensation they would require for equivalent service degradation, with this difference being particularly marked in relation to sewage overflows.

"Sewerage is more important than water, particularly in clean up response time."

Table 3-3: Average WTP and WTA for specified changes in sewerage network reliability

	Service improvement (WTP) **($ per annum)** 95 per cent confidence intervals in parentheses	**Service degradation (WTA)** **($ per annum)** 95 per cent confidence intervals in parentheses
One percentage point change in the number of customers experiencing a sewer overflow on their property each year	**$16.16** ($12.07, $20.24)	**-$85.97** (-$127.52, -$44.41)
One percentage point change in the number of customers experiencing a sewer overflow on their street or in nearby public land each year	**$5.88** ($3.43, $8.33)	**-$31.29** (-$50.30, -$12.28)
One hour change in the average time taken to stop an overflow and clean the affected area	**$20.83** ($14.94, $26.72)	**-$110.83** (-$166.01, -$55.65)

Source: Icon Water and University of Waikato 2017 (see Appendix 1).

3.5 Options analysis

"*I seriously believe that the costs of rates, land taxes, water rates etc are very high in Canberra… I really don't want to see any more increases.*"

We partnered with WISER Analysis and SEAMS/AECOM to model the impacts on service outcomes from increased or reduced spending on network renewals and other types of proactive maintenance.

The modelling was used to generate eight cost-service options for water supply reliability, ranging in expenditure on water mains renewal from $0 to $4 million per annum (see Table 3-4). The zero-cost option involved no proactive renewal. This option is not significantly different from a policy of asset renewal following three failures in a 12-month period, which would trigger only around $100,000 in renewal expenditure per annum. The $0.5 million and $1 million options were based on renewal triggered by two failures within a 12-month period, with 100 metres of replacement per renewal. The $1.5 million and $2.25 million options increased the target replacement per renewal to 150 metres and 200 to 250 metres, respectively. The $3 million and $3.5 million options involved applying a two-interruption policy (more frequent than a two-failure policy) to a problem cohort of cast iron pipes installed between 1965 and 1977. The $4 million option increased the target replacement per renewal to 300 metres, limited by the length in the shut-off block.

Table 3-4: Water service options

Option label	Annual expenditure on proactive water mains renewal ($million, 2016–17)
Renewal $0	0
Renewal $0.5 million	0.50
Renewal $1.0 million	1.00
Renewal $1.5 million	1.50
Renewal $2.25 million (baseline)	2.25
Renewal $3.0 million	3.00
Renewal $3.5 million	3.50
Renewal $4.0 million	4.00

Source: WISER Analysis 2017 and CIE 2017

The sewerage modelling, conducted in partnership with SEAMS/AECOM, was awarded the AMCouncil Asset Management Award 2017 in the category for Asset Management Cost/Risk/Performance. This award recognises excellence in the management of physical assets through their life cycle and showcases use of best practice asset management systems and processes. The modelling was used to generate five cost-service options for sewerage service reliability over a period of 20 years (see Table 3-5):

- no proactive investment
- budget cap, which involved a constant annual spend on closed circuit television (CCTV), cleaning, local repair and renewals
- reduced budget cap, which involved a 10 per cent reduction in expenditure on CCTV, cleaning and local repair relative to the budget cap option

- maintain service, which involves spending below the budget cap option early in the 20-year period and above the budget cap later in the period
- decrease performance, which involved undertaking only CCTV and cleaning to allow failure rates to deteriorate to Sydney Water's level by 2037
- improve performance, which involved undertaking significant expenditure, particularly on renewal, to improve failure rates to the national average by 2037.

Table 3-5: Sewerage service options

Option label	Proactive expenditure over 20 years ($million, 2016-17)	Activities
No proactive investment	0	N/A
Budget cap (baseline)	172.83	CCTV, cleaning, local repair and renewals
Reduced budget cap	165.94	CCTV, cleaning, local repair and renewals
Maintain service	170.82	CCTV, cleaning, local repair and renewals
Decrease performance	34.78	CCTV and cleaning
Increase performance	568.10	CCTV, cleaning, local repair and renewals

Source: SEAMS (2017); CIE (2017).

Icon Water then commissioned the CIE to undertake a benefit-cost analysis of these options using the results of the choice modelling survey to quantify the value of changes in service for each option. The CIE report is provided at appendix 2.

The analysis was conducted in a formal economic benefit-cost analysis framework and estimated the present value of net benefits from each option relative to the base case option. The net present values for each water option relative to the 'Renewal $2.25 million' base case are set out in Table 3-6.

With respect to water supply, the results indicated that:

- customers are not willing to pay for increased spending on proactive investment in the water network
- customers would be willing to accept an increase in the rate of water supply interruptions, given the bill savings that would entail.

Water mains renewals are much more expensive than mains repair, with the modelling indicating that the mains renewal cost per avoided customer interruption is around $8,500 in present value terms (the present value of expenditure on the base case is around $30 million and the present value of customer interruptions avoided relative to the 'Renewals $0' option is around 3,500 interruptions). On average, customers are not willing to incur that cost to avoid a water supply interruption.

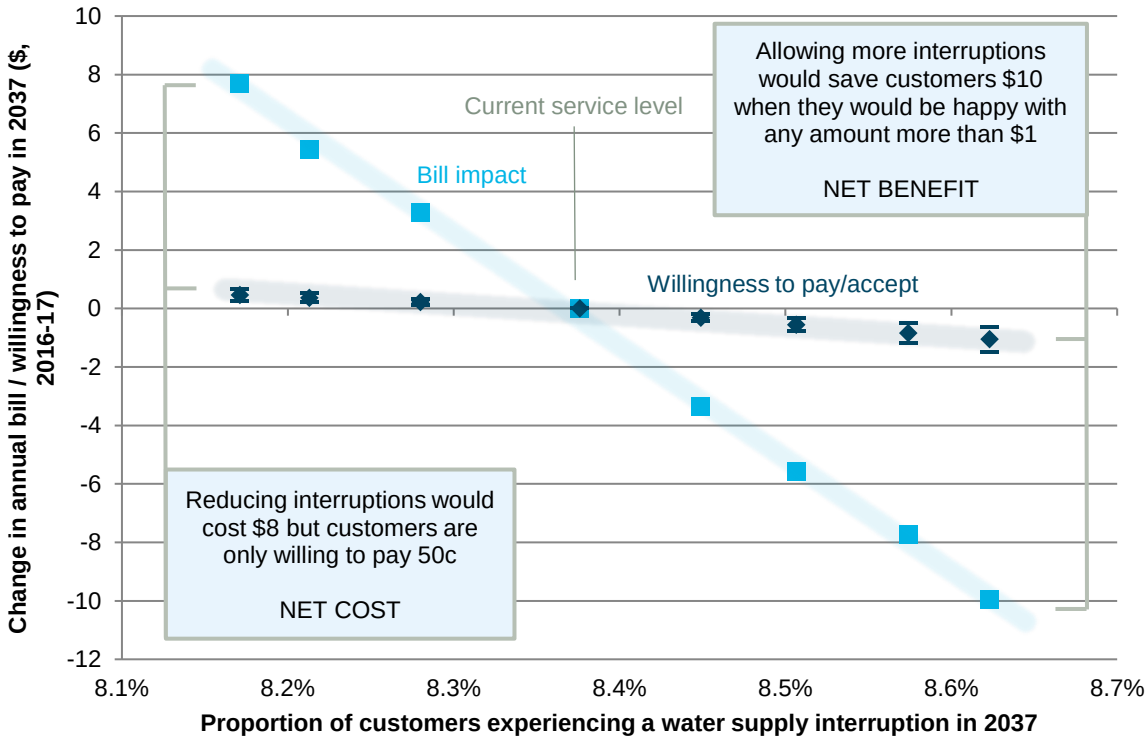
Table 3-6: Present value of water options relative to Renewal $2.25 million option

Option	Central estimate ($million, 2016-17)	Lower bound assumptions ($million, 2016-17)	Upper bound assumptions ($million, 2016-17)
Renewal $0	22.75	23.22	21.64
Renewal $0.5 million	17.66	18.04	16.77
Renewal $1.0 million	12.68	12.93	12.10
Renewal $1.5 million	7.64	7.78	7.32
Renewal $3.0 million	-7.64	-7.76	-7.35
Renewal $3.5 million	-12.72	-12.93	-12.23
Renewal $4.0 million	-17.93	-18.18	-17.30

Source: CIE (2017).

Figure 3-6 illustrates the cost impacts and customer WTP/WTA for the various water options in a single year, 2037, by way of example. The impacts on service increase over time, but the figure shows that, even after 20 years, the average risk of customer supply interruptions is not drastically changed, with all options lying between 4 per cent (1 in 25 years) and 5 per cent (1 in 20 years). The left-hand side of the figure shows customer WTP, at less than $1 per annum, is well below the bill increase of $8 per annum corresponding to a reduction in the likelihood of interruptions from 4.3 to 4.1 per cent. The right-hand side of the figure shows the bill reduction from reduced spending on water mains renewal goes well beyond the minimum reduction customers would accept.

Figure 3-6: Cost and willingness to pay for water service changes



The net present values for each sewerage option relative to the budget cap option are set out in Table 3-7.

Table 3-7: Present value of sewerage options relative to Budget Cap option

Option	Central estimate ($million, 2016-17)	Lower bound assumptions ($million, 2016-17)	Upper bound assumptions ($million, 2016-17)
No proactive investment	26.56	70.28	-137.72
Reduced budget cap	0.48	2.58	-7.38
Maintain service	-6.82	5.45	-52.80
Decrease performance	36.45	63.08	-63.36
Increase performance	-163.30	-167.25	-148.86

Source: CIE (2017).

With respect to sewerage services:

- the results indicated that customers are not willing to pay for increased spending on proactive investment in the sewerage network
- it is not clear whether customers would favour reduced proactive investment in the sewerage network.

Figure 3-7 shows the cost impacts and customer WTP/WTA for the various sewerage options in a single year, 2027, by way of example. The impacts on service increase over time, but the figure shows that, even after 10 years, the average risk of customer supply interruptions remains low, with all options lying between 1.7 per cent (1 in 59 years) and 2.7 per cent (1 in 37 years). The left-hand side of the figure shows customer WTP, at around $3 per annum, is well below the bill increase of $82 per annum corresponding to a reduction in the likelihood of external overflows from 2.0 to 1.7 per cent. The right-hand side of the figure shows the bill reductions from reduced spending on proactive sewerage maintenance are similar to the minimum reduction customers would accept.

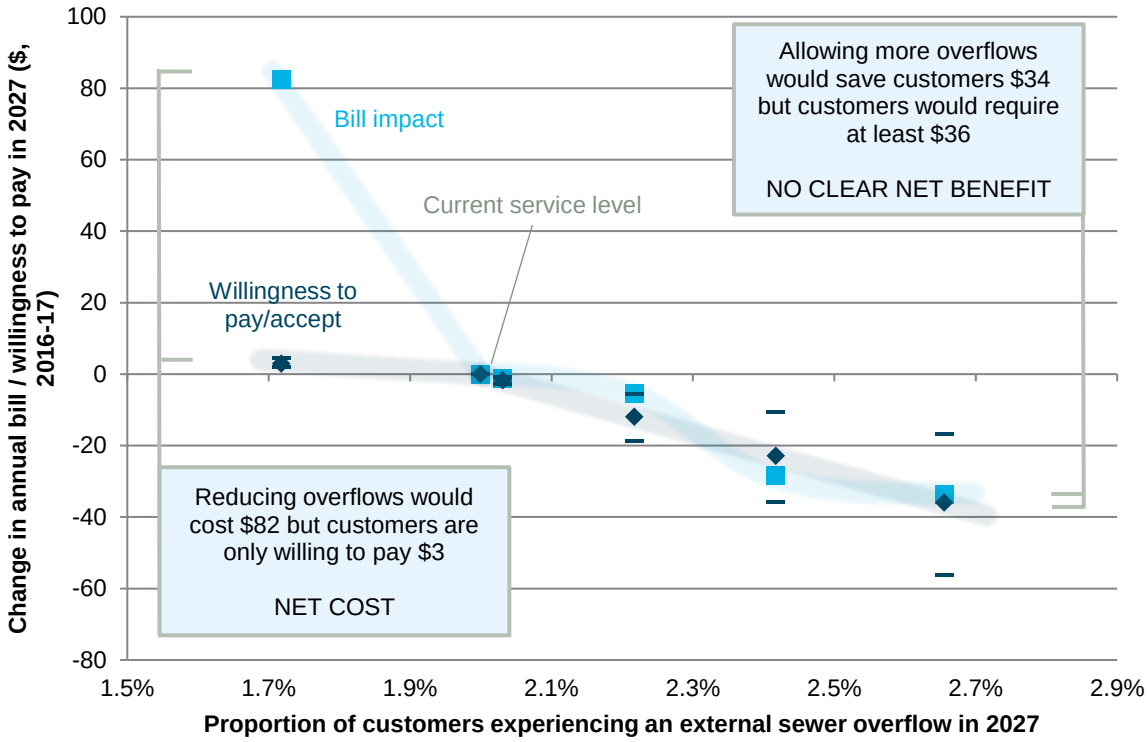
3.6 How customer preferences have influenced our proposal

Icon Water is increasingly linking its asset management plans to a range of customer outcomes, not only water supply interruptions and sewage overflows. For example, having identified that customers value the taste of drinking water, our plans include objectives on this measure, which drive limits of chlorine use and reliability targets at water treatment plants.

In response to the specific research findings outlined in this attachment, we propose:

- a measured reduction in expenditure on water mains renewals relative to the amount required to maintain current performance
- to undertake the proactive sewerage maintenance in the base case ‘Budget Cap’ option.

Figure 3-7: Cost and willingness to pay for sewerage service changes



Although the benefit-cost analysis indicated that net benefits would be maximised by ceasing water mains renewal, it did note that a different approach may be required for specific parts of the network. We decided against ceasing proactive water mains renewals (for structural failures) altogether for three main reasons:

- Prior to the research undertaken over the past 18 months, Icon Water had been planning to increase water mains renewal (Icon Water 2015). These plans involved replacing 427 kilometres of mains over 30 years, based on an expectation of a bow wave of age-based renewal. The more efficient approach of assessing failure rates by age and pipe material that we have adopted suggests many of the older assets may be in good condition for many years to come and only 96 kilometres of mains will need to be replaced over that period. However, a precautionary approach is warranted given the significant change in recommendations between our previous and current analysis.
- In some areas, with higher-density housing or a concentration of commercial customers, the benefits of renewal would be significantly higher than the average used in the benefit-cost analysis.
- The resulting gradual increase in unplanned water supply interruptions over time would fall on our worst-served customers (in areas with cast iron pipes installed in between 1965 and 1977), raising equity issues.

It is also important to note the analysis applied to mains renewals only for structural failures, as distinct from hydraulic mains renewals required to meet regulated fire flow standards.

We propose to continue spending around $2 million per annum on water mains renewals (for structural failures), targeted at areas where benefits are likely to be greatest, while we further investigate these equity issues. Depending on the outcomes from this process, we may propose further reductions in water mains renewal spending from 2023.

After taking account of impacts on network reliability and reactive maintenance costs, this proposal will result in:

- a saving of $1.23 million on customer bills
- no discernible increase in the average rate of unplanned water supply interruptions within the 2018–23 regulatory period (with an expected increase of one interruption per 1,000 properties per year over multiple regulatory periods)
- a stable number of sewerage service interruptions at around 1,630 per annum, on average over the 2018–23 regulatory period.

On the basis of the evidence presented in this section, these changes represent improvements in the efficiency of investment in water and sewerage networks for the long-term interests of consumers in relation to the price and reliability of the service.

4 Service targets

Icon Water is planning to reduce its operating costs significantly in the 2018–23 regulatory period. With the exception of reduced spending on water mains renewal, these cost reductions will be achieved by finding ways of operating more efficiently, rather than by sacrificing service performance. Customers can expect a continuation of the strong performance delivered in the 2013–18 period.

Our targets for the 2018–23 period are set out in Table 4-1, focusing primarily on measures that relate to customer outcomes, rather than technical measures. Icon Water will continue to review its service level indicators during the regulatory period to improve the extent to which they capture customer experience.

On some measures, we are challenging ourselves to deliver improved performance. These measures include customer satisfaction, for which we are targeting an increase to over 90 per cent, and the proportion of calls answered by our phone operators within 30 seconds, for which we are targeting an increase to over 80 per cent.

In contrast to our water quality and customer service targets, which are minimum standards we expect to meet in each and every year, the targets for network reliability relate to average performance over the 2018–23 regulatory period. Performance may fluctuate from year to year due to changing weather conditions and other factors outside of Icon Water's control. In particular, prolonged dry weather can cause tree root incursion and Canberra's clay soils to contract and damage pipes. Over the past five years, conditions have been favourable and the rates of water main breaks and sewerage main breaks and chokes have been significantly lower than those experienced during the preceding drought conditions. When setting our targets, we need to consider the possibility that these favourable conditions may not continue. As a result, our targets differ slightly from our actual performance over the past five years.

In most cases, these targets represent a significant improvement on the targets we set for the 2013–18 regulatory period. Our targets for unplanned water interruptions are significantly better than the average performance across the Australian water industry and represent a continuation of the targets for 2017-18 in our *Statement of Corporate Intent*. While our target rate of sewerage interruptions is relatively high among major utilities, our research indicates customers are, on average, not willing to pay the cost of improving this aspect of our service and our target for responding to those events is significantly quicker than the national average.

Table 4-1: Icon Water key service targets

Customer priority	Measure	Target 2013–18	Icon Water average 2011–16	Industry average 2011–16	Target 2018–23
	Survey respondents 'satisfied' or 'very satisfied' with Icon Water's service (%)	N/A	86	N/A	>90
	Total water and sewerage complaints (per 1,000 properties) (a)	5.4–7.5	4.4	4.7	<5
	Meaningful response to complaints within 20 business days (%)	N/A	97	N/A	100
	Calls answered by an operator within 30 seconds (%) (a)	N/A	72	76.6	>80
	Drinking water: population where microbiological compliance was achieved (%) (a)	100	100	99.9	100
	Average frequency of unplanned interruptions - water (no per 1,000 properties) (a)	116–126	84	148	95[d]
	Average duration of an unplanned interruption - water (minutes) (a)	111–112	125	126	130[d]
	Average planned water supply interruption duration (minutes) (b)	N/A	23	N/A	23[d]
	Unplanned interruptions to sewerage services per annum (b)	N/A	1,471[c]	N/A	1,630[d]
	Average sewerage interruption (minutes) (a)	38–44	37	162	40[d]
	Number of sewer surcharges inside customer dwellings per annum	N/A	N/A	N/A	<=15
	Incorporate a sustainability infrastructure scorecard into 100 per cent of capital projects over $50,000				
	Reduce our waste to landfill year on year				
	Achieve 100 per cent compliance with environmental flow requirements, environmental authorisations and agreements				

Source: (a) Bureau of Meteorology 2017, National Performance Report 2015-16; (b) ICRC annual reports.

Note: (c) The average for the past three years is 1,631. (d) Denotes a target to be met on average over several years. All other targets are minimum performance levels to be met on an annual basis.

Appendix 1 Willingness to pay research

This appendix contains the willingness to pay study, attached as a separate pdf document.

Appendix 2 Benefit-cost analysis

This appendix contains benefit-cost analysis of water and sewerage network management options, attached as a separate pdf document.

Abbreviations and acronyms

ACT	Australian Capital Territory
CCTV	closed circuit television
CIE	Centre for International Economics
ICRC	Independent Competition and Regulatory Commission
QUU	Queensland Urban Utilities
SCI	Statement of Corporate Intent
UTR	Utilities Technical Regulator
WTA	willingness to accept
WTP	willingness to pay

References

ACT Government (1997). Independent Competition and Regulatory Commission Act 1997. A1997-77. Republication Number 23, Effective date 1 September 2016. A. P. Counsel. Canberra, ACT Government.

ACTEW (2012). Main submission to the ICRC – regulated water and sewerage services from 1 July 2013, July.

Bureau of Meteorology (2017). National Performance Report 2015-16.

CIE (2005). Economic benefit-cost analysis of new water supply options for the ACT, April. Centre for International Economics.

CIE (2017). Benefit-cost analysis of water and sewerage network management options. Report for Icon Water, June. Centre for International Economics.

Icon Water (2015). Industry Panel public hearing presentation, 6 February.

Icon Water and University of Waikato (2016). Willingness to pay: customer preferences for balancing cost with risks of water supply interruptions and sewer overflows.

McNair, B. and Ward, M. (2012). Willingness to pay research project. Final Report to ACTEW Corporation, March.

NERA and AC Nielsen (2003). Willingness to pay research study. A Report for ACTEW Corporation and ActewAGL, September.

Purves, T., Larkings, K. and Salma, S. (2015). “The trade-off between water security and cost.” Ozwater conference paper, May.

SEAMS (2017). Scenario summaries. Data reported to Icon Water, 24 February

WISER Analysis (2017). Investment planning for water reticulation pipes in Icon Water. Report to Icon Water, January.