Attachment 7

Operating expenditure

30 June 2017

2018–23 Water and Sewerage Price Proposal

Table of contents

List of tables

List of figures

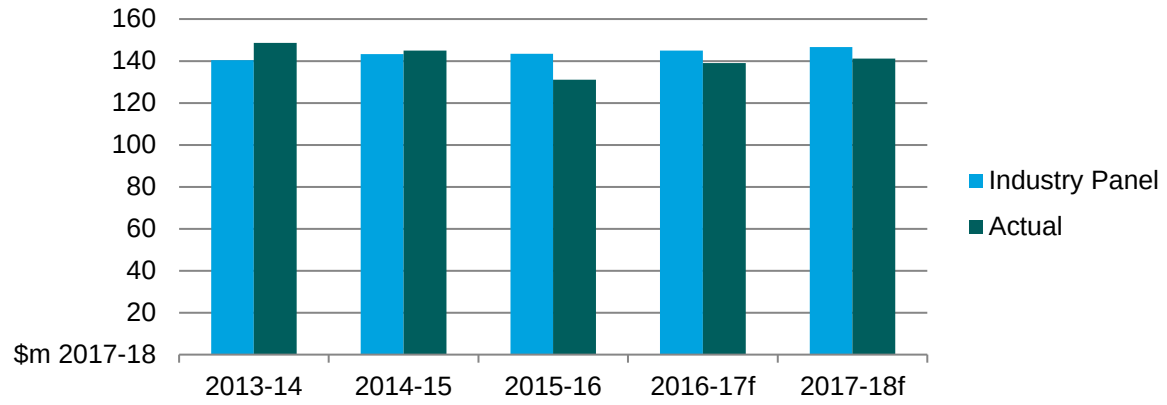
List of boxes

1 Summary

This attachment presents Icon Water's operating expenditure (opex) in the current 2013–18 regulatory period and forecast opex in the 2018–23 regulatory period.

During the 2013–18 regulatory period Icon Water has achieved efficiencies and some forecast operating expenses were not realised, resulting in the opex allowance being underspent (Figure 1-1). Total opex for the current regulatory period is forecast to be $888.6 million, which is 1.7 per cent less than the Industry Panel's opex allowance[1]. Icon Water's yearly opex, which includes controllable and non-controllable costs, has fallen since the beginning of the current regulatory period, from $183.1 million in 2013–14 to a forecast $179.5 million in 2017–18. This reflects a reduction in controllable opex.

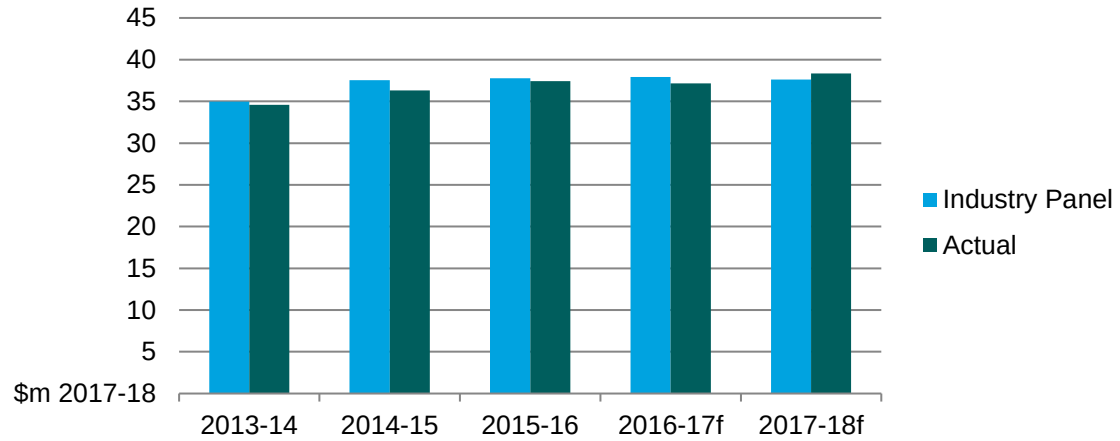
Figure 1-1: Icon Water's controllable opex and the Industry Panel's 2015 decision ($million, 2017–18)



Source: Icon Water analysis.

Note: **f** – forecast.

Figure 1-2: Icon Water's uncontrollable opex and the Industry Panel's 2015 decision ($million, 2017–18)



Source: Icon Water analysis.

Note: **f** – forecast.

[1] Unless otherwise specified, all financial information in this attachment is expressed in 2017–18 dollars.

Icon Water's total opex (controllable + uncontrollable) in the 2018–23 regulatory period is forecast to be $855.5 million (Table 1-1). This forecast represents a 3.7 per cent decrease (in real terms) compared to the 2013–18 period. The main drivers of the forecast decrease in opex are:

- efficiency improvements from business restructuring which has taken place during the current regulatory period
- expected cost savings in corporate overheads from a number of projects
- negative step changes in electricity expenditure associated with capital expenditure (capex) in renewable energy infrastructure. This investment is expected to result in reduced electricity consumption from the grid

Partially offsetting forecast lower controllable opex is a forecast increase in uncontrollable opex. The combined Utilities Network Facilities Tax (UNFT) and Water Abstraction Charge (WAC) liability is forecast to increase from $38.4 million in 2018–19 to $41.4 million in 2022–23. Icon Water's forecast total opex for each year of the 2018–23 regulatory period is shown in Table 1-1.

Table 1-1: Icon Water's opex forecast by category ($million, 2017–18)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
Controllable	60.2	59.6	59.3	60.5	60.1	**299.8**
Non-controllable	33.9	34.4	35.0	35.6	36.2	**175.1**
Sewerage						
Controllable	71.7	71.0	70.5	71.8	71.4	**356.3**
Non-controllable	4.5	4.7	4.9	5.0	5.2	**24.4**
Total opex	**170.4**	**169.7**	**169.6**	**173.0**	**172.9**	**855.5**

Source: Icon Water analysis.

Icon Water operates within a regulatory framework with some cost drivers that are legislated by Government, and therefore not controllable. A forecast of the proportion of Icon Water's expenditure that is controllable and uncontrollable during 2016–17 (the base year) is depicted in Figure 1-3. The WAC and UNFT make up Icon Water's uncontrollable costs, and are estimated to account for 21 per cent of total opex in 2016–17.

Controllable costs are estimated to comprise 79 per cent of Icon Water's total opex in 2016–17. Icon Water's three largest controllable costs are labour, chemicals and electricity. Considerable growth in electricity prices in the National Electricity Market is placing upward pressure on Icon Water's electricity costs.

The *Independent Competition and Regulatory Commission Act 1997* (ICRC Act) does not include any specific criteria in relation to 'operating expenditure'. However, Icon Water believes the following matters from the ICRC Act[2] (Part 4,20), which the Commission must have regard to, are relevant when considering opex:

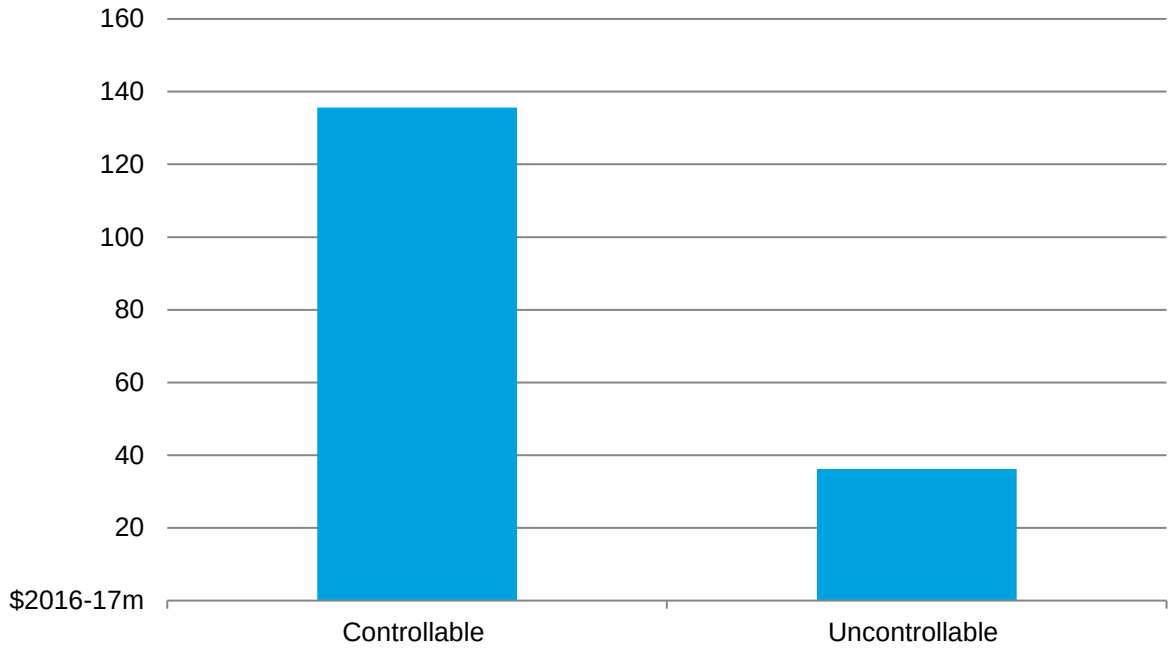
[2] ACT Government (1997): s(2)(20).

- the protection of consumers from abuses of monopoly power in terms of prices, pricing policies (including policies relating to the level or structure of prices for services) and standard of regulated services
- standards of quality, reliability and safety of the regulated services
- the need for greater efficiency in the provision of regulated services to reduce costs to consumers and taxpayers
- the cost of providing the regulated services
- the principles of ecologically sustainable development
- the effect on general price inflation over the medium term

Icon Water has taken into account the above when preparing the opex program. Using forecasting methods, step changes and escalators, Icon Water's forecast opex program is prepared with providing sufficient funds to:

- maintain levels of average network reliability for customers as required by the regulator
- support and maintain the new assets that have been constructed in the current regulatory period
- control and limit reactive maintenance
- meet current and known future compliance obligations
- achieve good asset management outcomes
- meet expected future demand
- meet the additional operating and maintenance expenditure required by the proposed capital program.

Figure 1-3: Forecast opex, by category (2016–17)



Source: Icon Water analysis.

2 Historical opex 2013–18

2.1 Overview

The total (water and sewerage) opex allowed by the Industry Panel for the current regulatory period was $904.4 million ($2017–18). This comprises $513.0 million for water and $391.3 million for sewerage (Table 2-1). Icon Water's actual total opex is forecast at $15.7 million (or 1.7 per cent) below that permitted by the Industry Panel (Table 2-2 and Table 2-3).

Table 2-1: Icon Water's actual/forecast opex and the Industry Panel's Final Decision ($million, 2017–18)

	2013–14	2014–15	2015–16	2016–17	2017–18	Total
Water						
Actual	99.4	101.4	93.2	96.9	99.9	490.8
Industry Panel	98.8	103.6	103.5	103.4	103.7	513.0
Sewerage						
Actual	83.7	79.9	75.3	79.4	79.6	397.9
Industry Panel	76.5	77.2	77.7	79.4	80.5	391.3
Total - Actual	**183.1**	**181.3**	**168.5**	**176.2**	**179.5**	**888.6**
Total – Industry Panel	**175.3**	**180.8**	**181.2**	**182.8**	**184.2**	**904.4**

Source: Icon Water analysis.

Note: 'Actual' amounts for 2016–17 and 2017–18 are the most up to date forecasts from Icon Water Finance, as at April 2017.

2.2 Opex performance, 2013–18

2.2.1 Allowed verses actual opex, by category

Icon Water's yearly opex, which includes controllable and uncontrollable costs, has fallen since the beginning of the current regulatory period, from $183.1 million in 2013–14 to a forecast $179.5 million in 2017–18 (both in $2017–18). This fall reflects reductions in controllable opex (Table 2-2, Table 2-3 and Figure 2-1). Uncontrollable opex has risen, due to increased government charges and taxes.

Icon Water's controllable opex is forecast to be lower than the Industry Panel's allowance in three of the five years in the current regulatory period. In years one and two, actual controllable opex was above the allowance. However, by reducing expenditure on corporate services, Icon Water has brought its controllable opex under the Industry Panel's allowance over the remainder of the 2013–18 regulatory period.

Icon Water commenced a series of improvement initiatives in the second half of 2014–15, which were focussed on achieving operational efficiencies though changes to capabilities and structures of Business Services, Finance, Asset Management and Project Delivery areas. These initiatives achieved a reduction in controllable opex and have enhanced Icon Water's ability to deliver its capital works program.

These improvement initiatives have been followed by other improvement initiatives and the Business Transformation Program (BTP). These programs will create some additional costs in 2016–17 and 2017–18 but generate efficiency savings in the 2018–23 regulatory period.

Compared to the Industry Panel's allowance, actual controllable opex for 2015–16 appears relatively low. This is largely attributable to two factors. These were:

- A $4.3 million negative adjustment associated with the Comcare Exit Provision. This adjustment was too large and as a result a subsequent positive adjustment of $2.7 million was added to the following year's corporate services expenditure.
- A number of claims have been made against the Commonwealth and Icon Water in relation to allegedly inaccurate information purportedly given to former employees regarding their eligibility to join the Commonwealth Superannuation Scheme. These amounts are included within other employee provisions. To date, Icon Water has settled a number of these claims. Future claims fall into the categories of current claims in the process of pre-settlement, notified prospective claims and possible future claims.

  As of 30 June 2016, a provision has been recognised for current and prospective claims utilising a provision model developed by an independent expert. The provision has been calculated on the basis that Icon Water's liability is influenced by the initial amount claimed, the payout rate and Icon Water's share of the final settlement payable amount.

Table 2-2: Actual/forecast opex for the current regulatory period – water ($million, 2017–18)

	2013–14	2014–15	2015–16	2016–17	2017–18	Total
Maintenance	16.5	15.6	14.6	16.9	17.5	81.0
Operations and Planning	25.6	26.6	24.4	25.1	25.1	126.7
Corporate Services	26.6	26.8	20.7	21.7	23.4	119.2
Total controllable	**68.7**	**68.9**	**59.7**	**63.7**	**66.0**	**326.9**
WAC	26.7	26.9	28.7	28.4	28.6	139.3
UNFT	4.0	5.6	4.8	4.8	5.3	24.5
Total opex – water	**99.4**	**101.4**	**93.2**	**96.9**	**99.9**	**490.8**
Variance from Industry Panel Decision	0.6	(2.2)	(10.3)	(6.6)	(3.8)	(22.3)

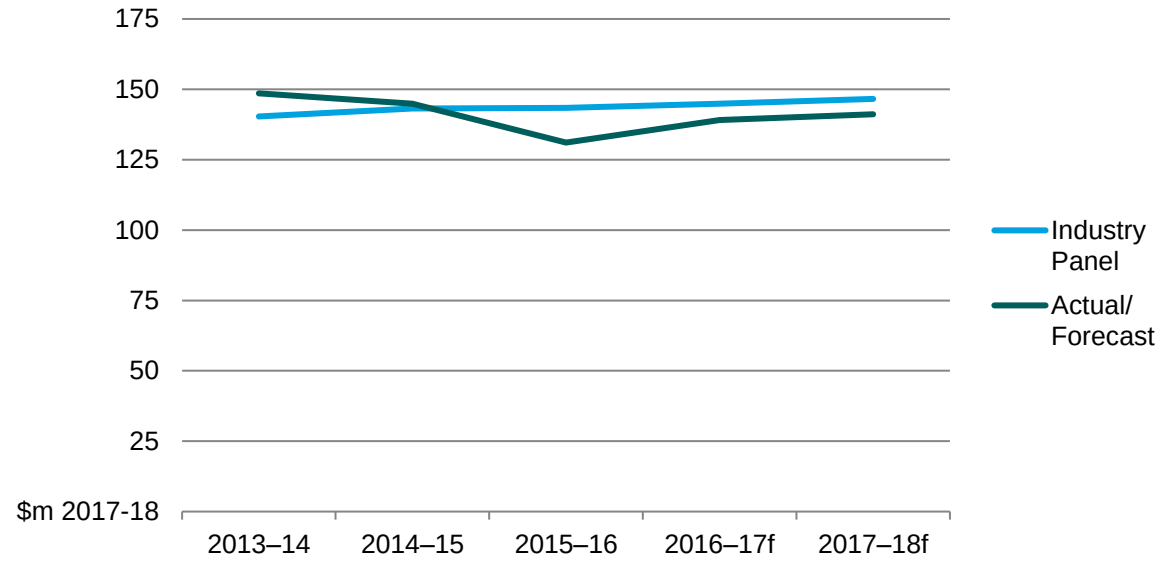
Source: Icon Water analysis.

Table 2-3: Actual/forecast opex for the current regulatory period – sewerage ($million, 2017–18)

	2013–14	2014–15	2015–16	2016–17	2017–18	Total
Maintenance	21.2	19.2	18.5	20.9	19.8	99.6
Operations and Planning	28.6	26.6	29.5	30.0	29.0	143.8
Corporate Services	30.0	30.2	23.4	24.5	26.4	134.4
Total controllable	**79.9**	**76.0**	**71.4**	**75.4**	**75.2**	**377.9**
UNFT	3.9	3.9	3.9	4.0	4.4	20.0
Total opex – sewerage	**83.7**	**79.9**	**75.3**	**79.4**	**79.6**	**397.9**
Variance from Industry Panel Decision	7.2	2.7	(2.4)	(0.0)	(0.9)	6.6

Source: Icon Water analysis.

Figure 2-1: Icon Water's controllable opex compared with Industry Panel decision



Source: Icon Water analysis.

Note: **f –** forecast.

3 Opex forecasting method

3.1 Methodology

Icon Water's opex forecast has been prepared on the following basis:

- A base-step-trend approach has been used for controllable costs.
- Annual category specific forecasts have been used for non-controllable costs, for which base-year expenditure does not necessarily reflect on Icon Water's expectations of these costs over the coming regulatory period.

Icon Water considers this approach best delivers a forecast that reflects the opex that would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering water and sewerage services in its circumstances.

The steps taken to develop Icon Water's controllable opex forecast for the 2018–23 period are outlined below and in Figure 3-1.

Step 1: Establish base-year opex

Icon Water reviewed its opex for the 2013–18 regulatory period to determine the base year. The level of opex established in the base year reflects the efficient level of recurring and controllable opex given the regulatory and operating environment at the start of the regulatory period. The proposed base year is 1 July 2016 to 30 June 2017 (2016–17).

Step 2: Make adjustments to base-year opex for non-recurrent costs

Adjustments were made to base-year opex to account for any non-recurrent costs incurred in that year, or changes in the treatment of costs applied between regulatory periods, to ensure the base-year opex used for forecasting reflects the efficient base costs incurred to provide water and sewerage services.

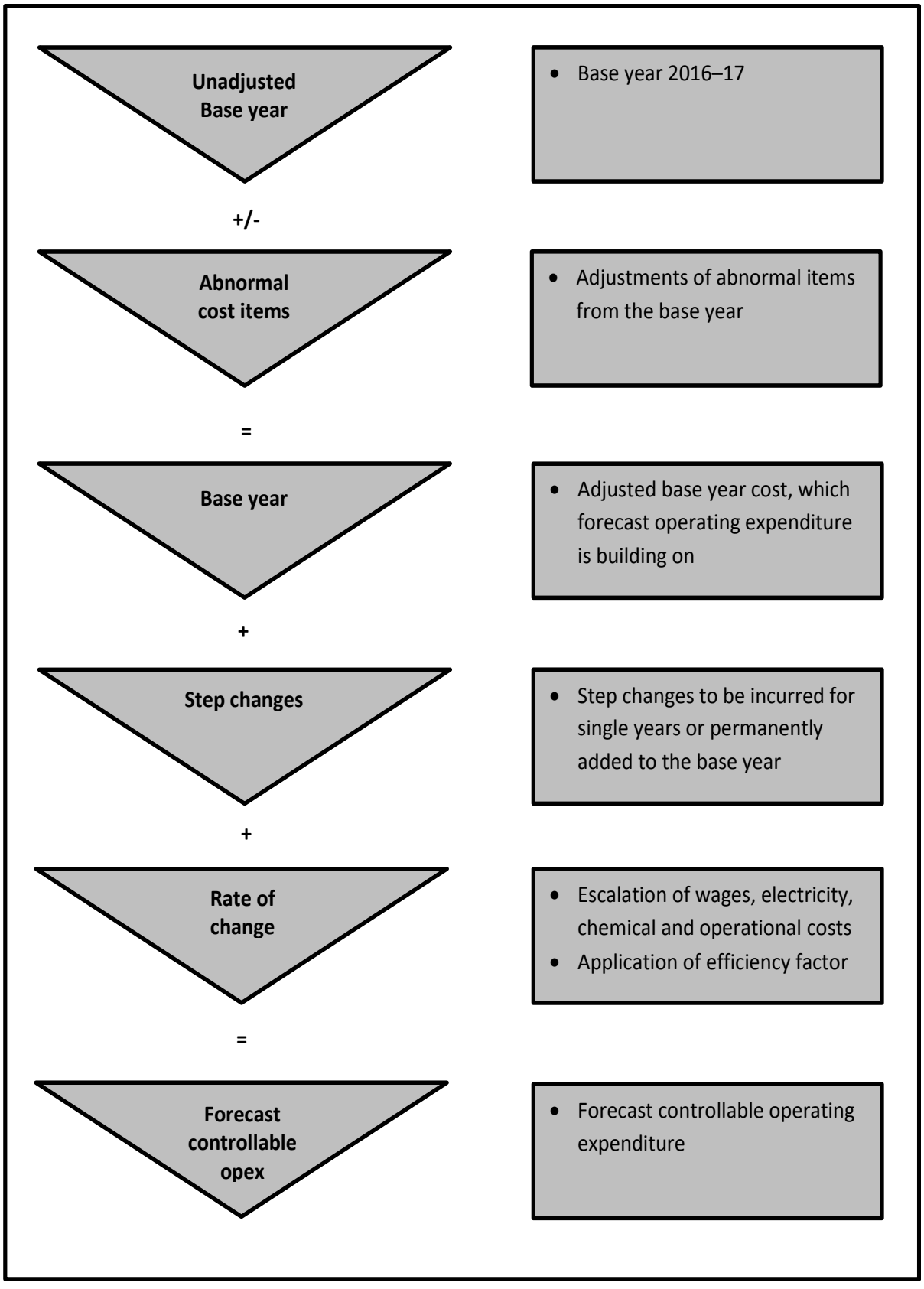
Step 3: Make annual adjustments to account for real price change, output growth and efficiency to trend the base-year opex across the regulatory period

Adjustments were made to trend Icon Water's adjusted base-year opex forward. This is represented as the annual rate-of-change in opex, determined by the following formula:

$$Rate\ of\ change_t = output\ growth_t + real\ price\ growth_t - efficiency_t$$

where $output\ growth_t$ is the expected growth in output, $real\ price\ growth_t$ is the real rate-of-change in input costs (labour and materials), and $efficiency_t$ is the rate-of-change of business improvement.

Figure 3-1: Forecasting methodology for controllable opex



The use of 'efficiency' rather than 'productivity' differs from how the base-step-trend approach has been applied in recent regulatory proposals. Efficiency in this context relates to the savings Icon Water expects to realise in the 2018–23 regulatory period from the changes to its business it has made in the current 2013–18 regulatory period (see section 3.2.1).

Step 4: *Add step changes*

Efficient foreseeable costs not reflected in base-year opex or trending were then added to the opex forecast as step changes. Icon Water's proposed step changes are detailed in section 4.4.

Step 5: *Add annual category specific forecasts*

After base opex has been trended and step changes added, Icon Water undertook category specific forecasts for non-controllable costs. For these categories, base-year costs do not necessarily reflect Icon Water's expectations of these costs over the next regulatory period.

Icon Water's uncontrollable opex forecast for the 2018–23 period is derived by multiplying forecast dam releases and network lengths by the appropriate WAC and UNFT rates. Icon Water has forecast dam releases and the length of the water and sewerage network for each year of the next regulatory period. These are then multiplied by forecast WAC and UNFT rates applicable to each year in the next regulatory period. Icon Water has reviewed the most recent ACT Government budget when formulating forecasts of future WAC and UNFT rates. The above calculation derives the total WAC and UNFT liability for each year in the next regulatory period. See section 4.8 for more details on forecast uncontrollable opex.

3.2 Base-year opex

Icon Water has selected the 2016–17 financial year (1 July 2016 to 30 June 2017) to be the base year for forecasting controllable opex in the 2018–23 regulatory period. Icon Water has forecast its 2016–17 controllable opex by using actual data relating to July 2016 to February 2017 expenditure, and estimated expenditure in the remaining five months to June 2017.

Icon Water's base-year opex estimate represents the costs of a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering water and sewerage services in the ACT. This is based on:

- opex cost efficiencies achieved over the current 2013–18 regulatory period
- Icon Water's actual opex costs compared with the amount approved as efficient by the Industry Panel
- Icon Water's operating performance relative to other utilities.

3.2.1 Cost restructures

Icon Water has recently undertaken substantial restructures of its business, some of which are still ongoing and informed by initiatives delivered by the Business Transformation Program (BTP). Measures were implemented to reduce opex, focusing on amalgamating and rationalising various corporate and support functions of the business. The review involved the identification of the key drivers for opex to ensure that the service activities and outcomes were aligned with the regulatory and commercial objectives of the business.

The restructures comprise of the following:

- Major restructure undertaken in the Finance Group
- Major restructure undertaken in the Project Delivery Group. The new structure is focused on improving project management capability and the creation of a Program Management Office which has standardised systems and processes to ensure greater certainty of delivery

- A review of the Safety and Business Solutions (SBS) Group to ensure Icon Water has the most effective and efficient structure to deliver services that meet the changing needs of the business, particularly in the critical areas of safety and corporate services. This resulted in an amalgamation of the SBS and Governance Groups to form a combined Business Services Group.
- A shift from a product-based split of water and sewerage functions in the areas of asset management, network planning and operations, to an approach that merged the water and sewerage asset management groups and reassigned corporate functions. The new operating model necessitated further organisational restructuring to ensure Icon Water has the most effective and efficient structure in place to support the changes.

These restructures have resulted in cost savings across the business. Most of the costs associated with the restructures and undertaking the BTP have been incurred in the current regulatory period, and the benefits of this expenditure have commenced to accrue.

3.2.2 Comparisons with other utilities

Icon Water has analysed data from the *National Performance Report*[3] to gain insight into how its opex performance compares to the other major urban water utilities. The analysis showed that Icon Water's operating costs per property relating to the water business is 5 per cent below the average of the major utilities (Figure 3-2).

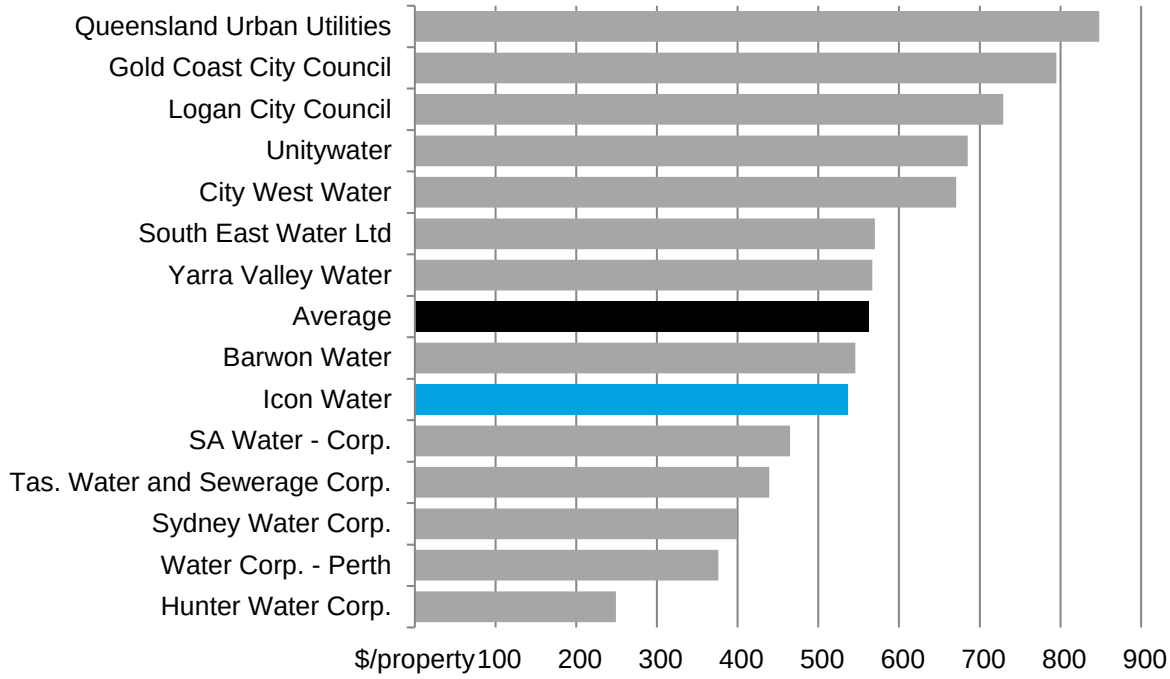
Icon Water's operating costs per property relating to the sewerage business is above average (Figure 3-3). Icon Water's sewerage operating costs per property are 10 per cent higher than the average for all major utilities, and higher than the sewerage operating costs per property for the top 25 per cent performing utilities across all utilities and major utilities.

Contributing factors to Icon Water's sewerage opex being above the average of the major utilities are some operational challenges particular to the ACT. These challenges include:

- relatively high rate of tree root incursion into sewerage pipes
- relatively high sewerage treatment standards.

[3] National performance report 2015–16: urban water utilities

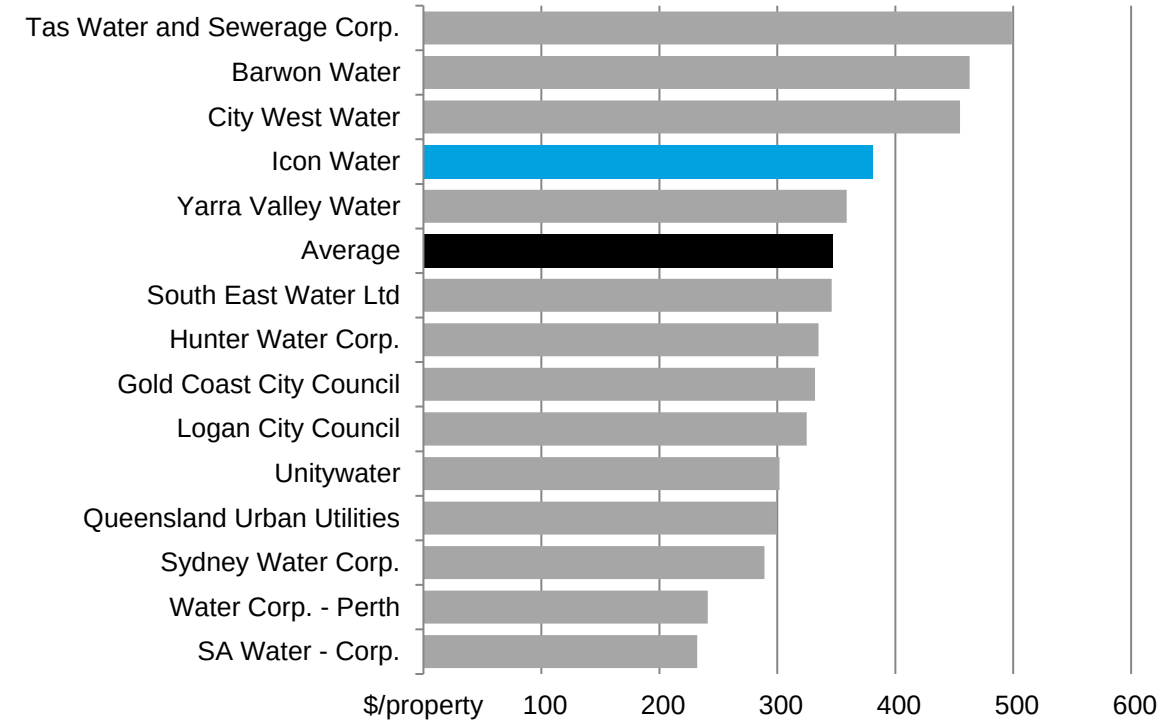
Figure 3-2: Icon Water's operating costs per property, water business (2015–16)



Source: Bureau of Meteorology (2017).

Note: WAC and UNFT is included in Icon Water's operating cost per property

Figure 3-3: Icon Water's operating costs per property, sewerage business (2015–16)

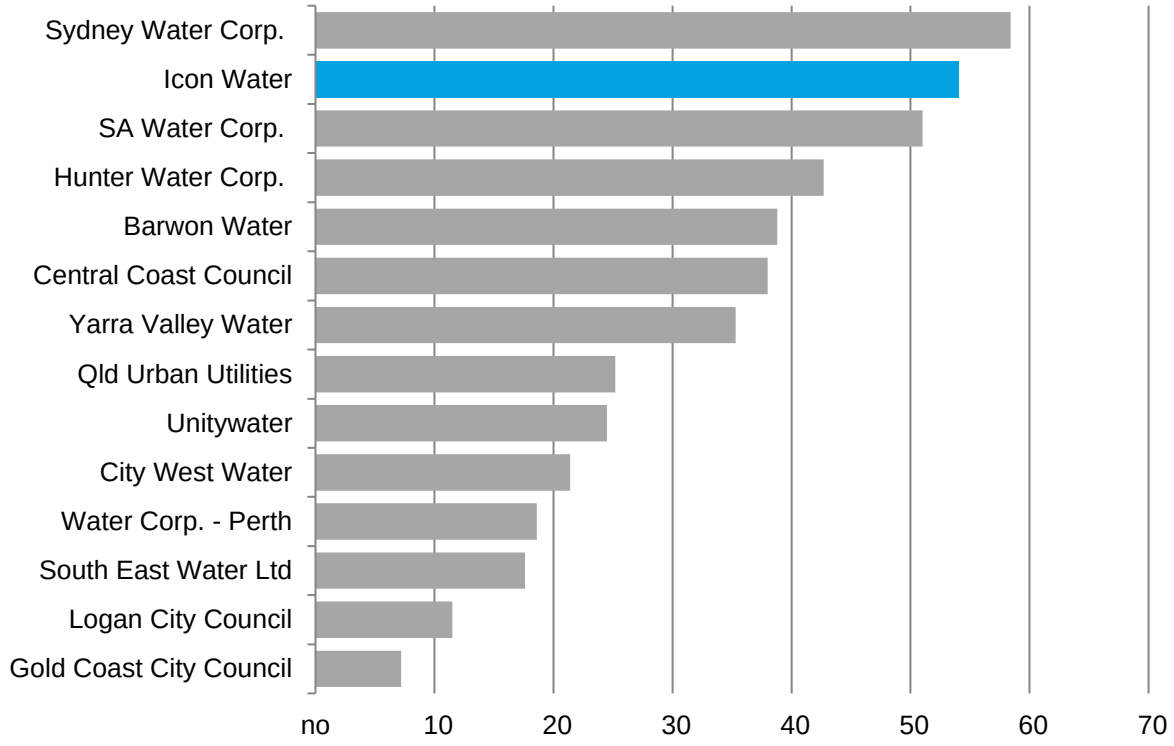


Source: Bureau of Meteorology (2017).

Note: WAC and UNFT is included in Icon Water's operating cost per property

The Icon Water network is subject to a relatively high rate of tree root incursion into sewerage pipes compared with the other major water networks (Figure 3-4).These incursions result in higher monitoring costs and cause blockages to occur in the ACT at a frequency that is higher than the Australian average. Icon Water's sewerage network had the second highest number (54.1 per 100 km) of breaks and chokes in 2015–16 of the networks with more than 100,000 customers. While this is considerably lower than in 2009–10 (105 per 100 km), which indicates significant progress has been made, sewer main breaks and chokes continue to place upward pressure on Icon Water's opex.

Figure 3-4: Number of sewer main breaks and chokes (per 100 km of sewer main), 2015–16



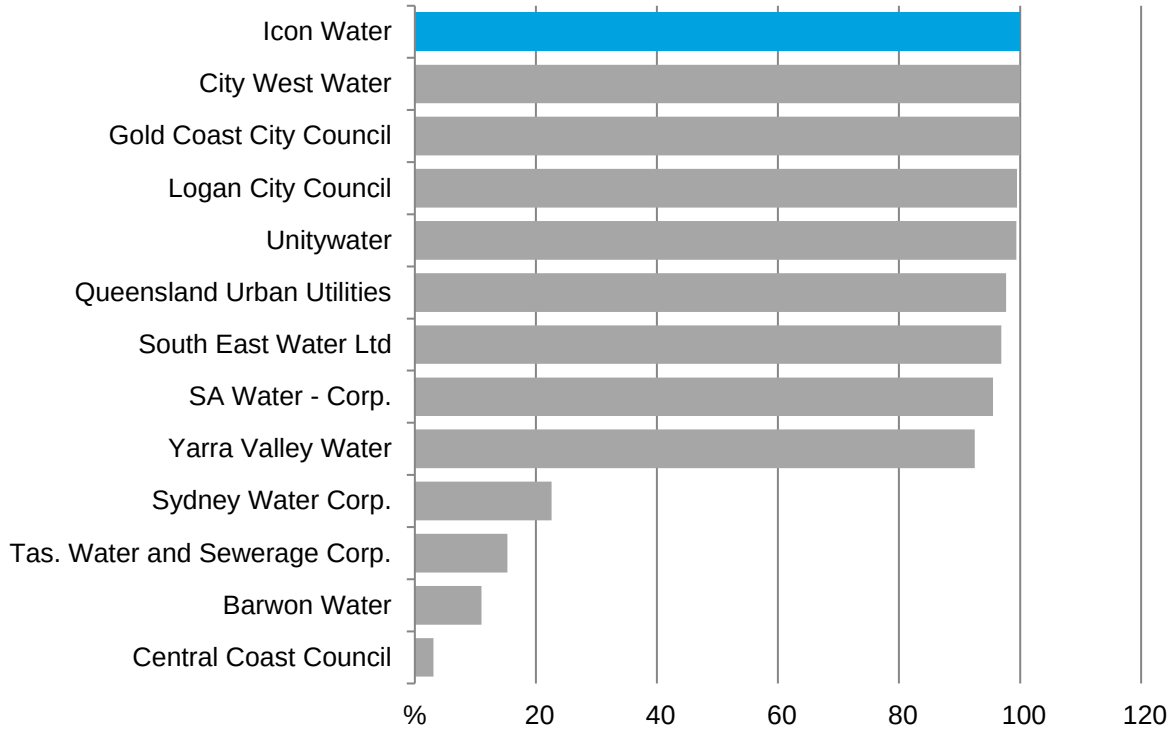
Source: Bureau of Meteorology (2017).

Icon Water is also subject to relatively high standards relating to the treatment of sewerage compared to many other major water utilities, which increases Icon Water's costs. Icon Water is required to treat all sewerage to a tertiary or advanced level, which is suitable for return to rivers and downstream users. Many other water utilities, particularly those in coastal regions, treat a smaller proportion of their total output at tertiary or advanced level, with a much larger proportion being processed to only the primary or secondary level (Figure 3-5).

Another factor which puts upward pressure on Icon Water's opex, compared to most other major water utilities, is the relatively low customer density of Icon Water's sewerage network (Figure 3-6). This reflects the urban design of most of Canberra, which is a collection of relatively low density suburbs with wide property frontages. Despite a growing number of brownfield medium and high density housing developments in the ACT in recent years, Icon Water had the fourth-lowest number of properties served per kilometre of sewer main of the major water utilities in 2015–16.[4]

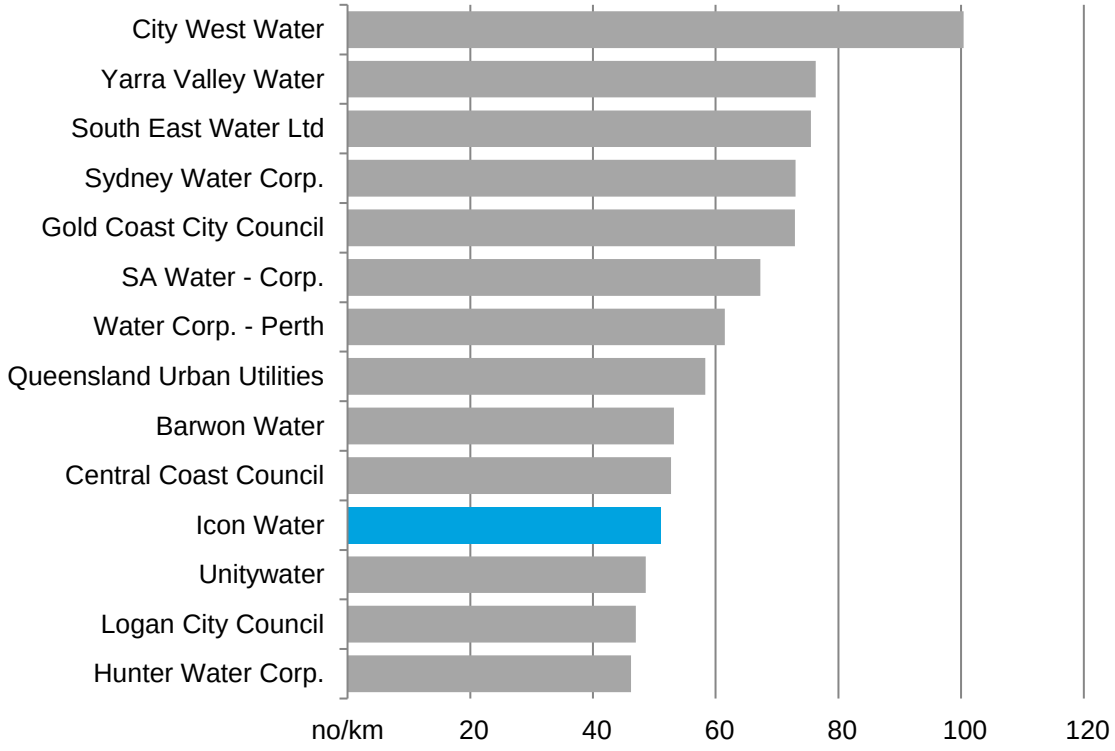
[4] Bureau of Meteorology, 2017

Figure 3-5: Sewerage treated to a tertiary or advanced level (per cent), major utilities



Source: Bureau of Meteorology (2017).

Figure 3-6: Properties served per kilometre of sewer main, 2015–16



Source: Bureau of Meteorology (2017).

3.2.3 Adjustments for non-recurring costs

Icon Water has made three adjustments to the 2016–17 base year to remove the presence of non-recurring expenditure. After these adjustments, Icon Water's base-year controllable opex falls from $135.6 million to $129.3 million ($2016–17). These non-recurring expenditure adjustments are depicted in Table 3-1 and include:

- costs associated with adjustments to the Corporate Services Agreement (CSA)
- a workers compensation provision adjustment
- costs associated with preparing the regulatory submission to the Independent Competition and Regulatory Commission (ICRC).

Table 3-1: Base year adjustments ($ 2016–17 million)

	2016–17
CSA adjustment	(1.8)
Workers compensation provision adjustment	(2.7)
Regulatory submission and tariff review costs	(1.8)
Total	**(6.3)**

Source: Icon Water analysis.

The CSA adjustment reflects a review of the services required by Icon Water under the CSA. This cost is not recurrent in nature and has been removed from the base year. The total value of this adjustment is $1.8 million (Table 3-1).

The service agreements between Icon Water and ActewAGL expire in 2023, at the end of the 2018–23 regulatory period. During the 2018–23 regulatory period, Icon Water will commence a process to review how these services will be sourced from the expiry date of the agreements. The regulatory submission for the period commencing in 2023 will contain details about the process followed and the outcome of this review.

The second adjustment made to the base year was to remove a workers compensation provision adjustment valued at $2.7 million. Icon Water exited Comcare as its workplace health and safety insurer during 2012–13. However, Icon Water remains liable for payment of historical claims before its exit. Icon Water's provision in 2016–17 for the payment of such claims is $2.7 million. This cost is non-recurrent and is expected to decline over time as historical claims are settled.

The third adjustment made to the base year was to remove costs associated with preparing the regulatory submission. This cost is not a recurring component of Icon Water's opex. It only appears in the penultimate and last year of the regulatory period and is associated with the preparation of the submission relating to the subsequent control period.

4 Forecast opex 2018–23

4.1 Overview

Icon Water's total opex in the 2018–23 regulatory period is forecast to be $855.5 million ($2017–18), 3.7 per cent lower than the current regulatory period (Table 4-1 and Figure 4-1). The proportion of total opex made up of controllable items is forecast to fall, while the proportion made up of uncontrollable items is forecast to rise (Figure 4-2).

Icon Water's forecast opex for each year of the 2018–23 regulatory period (by category) is depicted in Table 4-1 and Table 4-2. This forecast is the product of a detailed review of Icon Water's existing operations, proposed operations and the expansion of projects to address issues in the network. These forecasts reflect an assumption of a continuation of the present levels of service quality and the demand assumptions discussed in Attachment 4 of this regulatory submission.

Using the base-step trend forecasting methodology, Icon Water's forecast opex program is prepared to provide sufficient funds to:

- maintain levels of average network reliability for customers as required by the regulator
- support and maintain the new assets that have been constructed in the current regulatory period
- control and limit reactive maintenance
- meet current and known future compliance obligations
- achieve good asset management outcomes
- meet expected future demand
- meet the additional operating and maintenance expenditure required by the proposed capital program.

Table 4-1: Icon Water's forecast opex, by category ($million, 2017–18)

	2018–19	2019–20	2020–21	2021-22	2022-23	Total
Water						
Controllable	60.2	59.6	59.3	60.5	60.1	**299.8**
Non-controllable	33.9	34.4	35.0	35.6	36.2	**175.1**
Sewerage						
Controllable	71.7	71.0	70.5	71.8	71.4	**356.3**
Non-controllable	4.5	4.7	4.9	5.0	5.2	**24.4**
Total opex	**170.4**	**169.7**	**169.6**	**173.0**	**172.9**	**855.5**

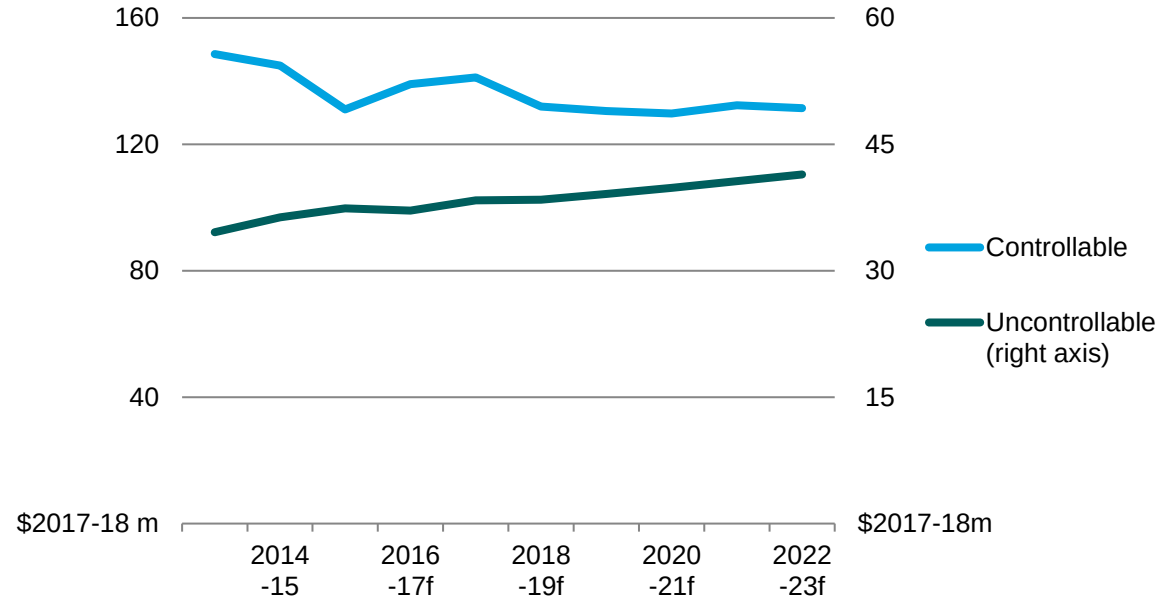
Source: Icon Water analysis.

Table 4-2: Icon Water's forecast opex, by detailed category ($million, 2017–18)

	2018–19	2019–20	2020–21	2021-22	2022-23	Total
Water						
Maintenance	16.7	16.6	16.5	16.4	16.4	**82.7**
Operations	14.2	13.9	13.8	13.8	13.7	**69.3**
Planning and strategic management	10.7	10.6	10.6	10.5	10.4	**52.8**
Corporate	18.6	18.5	18.4	19.8	19.6	**94.9**
Pass-throughs	33.9	34.4	35.0	35.6	36.2	**175.1**
Sewerage						
Maintenance	20.8	20.6	20.5	20.4	20.3	**102.7**
Operations	22.5	22.0	21.8	21.7	21.6	**109.6**
Planning and strategic management	7.5	7.4	7.4	7.4	7.3	**37.0**
Corporate	21.0	20.9	20.8	22.4	22.1	**107.1**
Pass-throughs	4.5	4.7	4.9	5.0	5.2	**24.4**
Total opex	**170.4**	**169.7**	**169.6**	**173.0**	**172.9**	**855.5**

Source: Icon Water analysis.

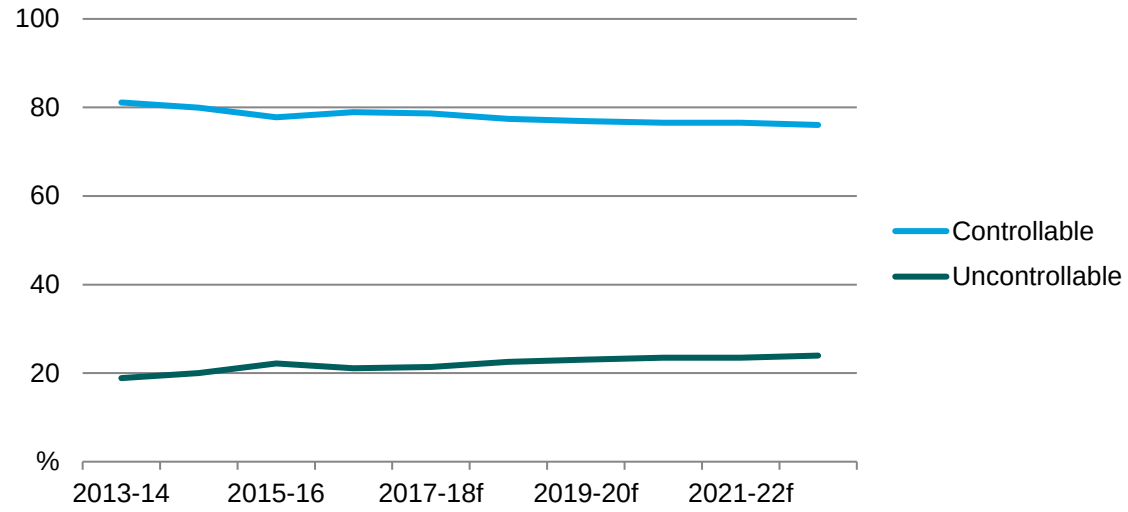
Figure 4-1: Icon Water's historical and forecast opex ($million, 2017–18)



Source: Icon Water analysis.

Note: **f** – forecast.

Figure 4-2: Icon Water's actual and forecast proportion of controllable and uncontrollable opex



Source: Icon Water analysis.

Note: **f** – forecast.

4.2 Opex cost categories

Icon Water's total opex is split between controllable and non-controllable costs. Over the three years to 2015–16, controllable opex averaged 79.6 per cent of Icon Water's total opex, with uncontrollable opex forming the remaining 20.4 per cent. During the 2018–23 regulatory period, uncontrollable opex as a proportion of total opex is forecast to rise reflecting real cost increases.

Controllable costs

The water and sewerage businesses allocate controllable costs into the following categories:

- planned maintenance
- reactive maintenance
- major maintenance
- operations
- planning
- pricing services
- asset management corporate costs
- project delivery
- safety corporate costs
- corporate business.

Non-controllable costs

Icon Water's uncontrollable costs from operating the water and sewerage network comprise the following two ACT Government fees:

- Water Abstraction Charge (WAC)
- Utilities Network Facilities Tax (UNFT).

4.3 Forecast cost savings

The main drivers of forecast efficiencies in the 2018–23 regulatory period are BTP and further savings from corporate service activities.

The BTP and continuous improvement initiatives seek to deliver foundational capabilities that will support Icon Water's ability to respond to future challenges and opportunities. These foundational capabilities include the adoption of enterprise asset management practices that align with ISO 5500X and the replacement of aged information technology systems. There are five work streams to be delivered within the BTP:

- Operating and Process Model: The Operating Model, Business Activity Model and Integrated Management System Process Definitions provide a blueprint of how Icon Water will operate, by aligning capabilities and processes to strategy to achieve business outcomes.
- Asset management and decision support: Development of a renewed asset management system that will ensure holistic end-to-end and efficient life-cycle asset management to achieve ISO 50001 readiness.
- Critical operational technology: Definition and implementation of critical operational systems supporting the direct management of the water network and delivery of stakeholder outcomes.
- Customer management: Processes and enabling systems to better understand and connect with our customers.
- Business and financial support: Business and financial support enablers.

In replacing aged technology systems, the BTP is seeking to provide sufficient flexibility in Icon Water's operational technology to allow the organisation to respond to future opportunities and challenges. In addition to the identified benefits in annual opex attributed to the program, the BTP will also provide a stable platform that will extend the operating efficiencies and benefits available to the organisation resulting from future growth in core business.

The opex efficiencies from the BTP and continuous improvement initiatives relate to reductions in salary costs, revision of the staff incentive scheme and reduced overtime and workers compensation costs.

During the 10 year horizon over which these efficiencies are being calculated, Icon Water's customer base is projected to grow by 31,000 customers at an average annual growth rate of around 1.7 per cent. This growth generates a requirement for increased maintenance throughout the water and sewerage networks. Ordinarily this expanded maintenance program would require an increase in Full Time Equivalent (FTE) staff numbers. Icon Water believes the FTE reductions arising from BTP and the continuous improvement initiatives are likely to offset this required increase in maintenance headcount.

4.4 Step changes

Regulatory step changes arise because a new regulatory obligation or a new operating activity, which requires additional or fewer resources, is required to ensure the network operates efficiently and prudently. The value of Icon Water's proposed regulatory step changes is depicted in Table 4-3. All of Icon Water's business step changes relating to projects initiated within Icon Water have been absorbed into the controllable opex forecast.

A regulatory step change in opex typically results from the introduction or removal of an obligation for the business, or the adjustment of operating and maintenance programs or projects as a result of asset changes. Generally, a step change will result in a departure from base-year operating and maintenance expenditure; either a 'step up' or 'step down' in expenditure compared with the base

year. In most cases, this is expected to be a permanent change, while in some cases it could appear periodically.

Icon Water is proposing two regulatory step changes each for water and sewerage for the 2018–23 regulatory period.

The first step change relates to costs associated with the preparation of regulatory submissions to the ICRC. These costs are non-recurrent in nature, and occur during the penultimate and last year of a regulatory period as the pricing submission relating to the subsequent control period is prepared.

The second step change relates to lower opex for electricity as a result of capex for new renewable energy infrastructure. In 2017–18, Icon Water will allocate funds for the purchase and installation of several solar photovoltaic systems in the ACT, with a total nameplate capacity of 2,580 kW. Once installed, these systems are expected to reduce Icon Water's electricity consumption from the grid and therefore its expenditure on electricity. These systems are also expected to generate additional income for Icon Water through the sale of renewable energy certificates. See *Attachment 6: Capital expenditure* for capex estimates and *Attachment 11: Revenue requirement and price path* for income generated by this project.

The regulatory step changes that Icon Water has proposed for the 2018–23 regulatory period will be accompanied by business cases prepared by Icon Water. These business cases will be provided to the ICRC as confidential appendices.

Table 4-3: Regulatory step changes ($million, 2017–18)

	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23
Water						
Regulatory submission	1.18	-	-	-	1.39	1.13
Solar PV installation	-	(0.14)	(0.27)	(0.27)	(0.27)	(0.27)
Sewerage						
Regulatory submission	1.33	-	-	-	1.56	1.27
Solar PV installation	-	(0.27)	(0.53)	(0.53)	(0.52)	(0.52)
Total step changes	**2.50**	**(0.40)**	**(0.80)**	**(0.80)**	**2.16**	**1.61**

Source: Icon Water analysis.

4.5 Real price growth forecasts

To calculate forecasts of real price growth, Icon Water analysed base-year (2016–17) expenditure to determine for each cost category the proportion attributable to labour, chemicals, electricity and operational costs. The share of each cost input for each of Icon Water's cost categories for 2016–17 is depicted in Table 4-4 and Table 4-5. Note that in our calculations, each step change (section 4.4) has also been broken into the same cost inputs so that they are also escalated accurately.

Table 4-4: Breakdown of respective cost category into cost components, water, 2016–17 (% share)

	Labour	Chemicals	Electricity	Operational costs
Planned maintenance	50.6	0.4	0.2	48.7
Reactive maintenance	47.2	0.0	0.0	52.8
Major maintenance	10.9	0.0	0.0	89.1
Operations	30.6	14.7	12.2	42.4
Planning	25.8	0.0	0.0	74.2
Pricing services	49.9	0.0	0.0	50.1
Asset management corporate costs	67.2	0.0	0.2	32.6
PDOM corporate costs	67.2	0.0	0.2	32.6
Safety corporate costs	67.2	0.0	0.2	32.6
Corporate business	67.2	0.0	0.2	32.6

Source: Icon Water analysis.

Table 4-5: Breakdown of respective cost category into cost components, sewerage, 2016–17 (% share)

	Labour	Chemicals	Electricity	Operational costs
Planned maintenance	52.4	0.3	0.0	47.3
Reactive maintenance	51.1	0.0	0.0	48.9
Major maintenance	10.1	0.0	0.0	89.9
Operations	27.0	19.1	16.8	37.2
Planning	47.1	0.0	0.0	52.9
Pricing services	55.5	0.0	0.0	44.5
Asset management corporate costs	67.2	0.0	0.2	32.6
PDOM corporate costs	67.2	0.0	0.2	32.6
Safety corporate costs	67.2	0.0	0.2	32.6
Corporate business	67.2	0.0	0.2	32.6

Source: Icon Water analysis.

Icon Water commissioned BIS Oxford Economics (formerly BIS Shrapnel) to provide an expert report on the outlook for relevant cost escalators in the ACT. These forecasts are used as inputs into setting opex and capex forecasts for Icon Water. The BIS Oxford Economics report is provided at Appendix 1 to this attachment, with the remainder of this section providing a brief overview of the forecasts and Icon Water's application of these to trend its base opex.

Icon Water applied the following cost inputs for the purposes of calculating price growth over the 2018–23 regulatory period. The cost inputs are:

- Labour (Electricity, Gas and Water, and general labour) ACT specific
- Electricity (for industrial users) ACT specific

The escalation factors forecast by BIS Oxford Economics for each cost input are presented in Table 4-6. Anticipated Increases in the enterprise bargaining agreements (EBAs) and EBAs currently under negotiation drive the short-term wage forecasts for the ACT utilities sector. Beyond the short-term, wages forecasts are driven by expectations of investment in the sector (as it is a key driver of employment), inflation, state economic outlook and movements in the Australian utilities sector wages. A risk for Icon Water when forecasting future opex is that growth in actual wages exceeds the forecast escalator in Table 4-6, which would make the controllable opex forecast more challenging to achieve.

Table 4-6: Cost escalators (per cent change, year-on-year, adjusted for CPI)

	2016–17	2017–18	2018–19	2019–20	2020-21	2021–22	2022–23
Electricity Gas Water labour - ACT	1.0	0.4	0.7	1.0	1.4	1.7	1.8
Electricity	24.0	11.8	0.8	0.6	(0.7)	1.3	1.3

Source: BIS Oxford Economics.

The electricity escalator reflects forecasts changes in electricity prices facing commercial customers in the ACT over the course of the next regulatory period. Significant short-term variability in the electricity escalator reflects wholesale electricity prices (using six-month forward contract prices), forecast network charges and the forecast cost of Federal and Territory environmental schemes. A risk for Icon Water is that the recent growth in electricity prices does not slow dramatically from 2018–19, as currently forecast by BIS Oxford Economics. If electricity prices were to continue growing considerably in real terms throughout the 2018–23 regulatory period, this would place upward pressure on Icon Water's opex. Because of this, a decision was made to try to mitigate a portion of this risk by installing a renewable energy system (section 4.4).

Icon Water's chemical and operational costs were escalated by an assumed CPI for the 2018–23 regulatory period. This is the mid-point of the Reserve Bank of Australia (RBA) target band for inflation of 2 to 3 per cent. A risk for Icon Water is that actual inflation is higher than the midpoint of the RBA's target band, which would place upward pressure on Icon Water's controllable opex.

Box 4-1: Likely revision to electricity price escalator for Icon Water's revised regulatory proposal

Icon Water engaged BIS Oxford Economics in January 2017 to formulate forecasts of growth in business costs, including wages and electricity. These forecasts relate to the final year of the current 2013–18 regulatory period and all of the 2019–23 regulatory period. BIS Oxford Economics reported to Icon Water with draft results in early February 2017, and these are the forecasts Icon Water has used in this proposal.

During the time BIS Oxford Economics completed its forecasts, there was considerable growth in wholesale electricity prices in the National Electricity Market[5]. It is highly likely the growth in Icon Water's electricity costs will exceed the growth forecast rate produced by BIS Oxford Economics. As a result, BIS Oxford Economics will be engaged to revise its forecast of growth in electricity prices to take into account these recent market developments. These revised forecasts will be included in Icon Water's submission to the ICRC in early 2018, following the Commission's Draft Report[6].

4.6 Interaction between opex and capex, forecast output and efficiency

In addition to input quantities and prices, operating and maintenance costs are driven by Icon Water's assumed growth in capex as the network expands with growth in the number of customers. This interaction between opex and capex has been taken into account during the development of Icon Water's forecast of controllable opex.

Opex included in the forecast enables delivery of Icon Water's maintenance program which has been developed in accordance with asset management plans. These plans set out a best practice approach for all asset classes, including both capex and opex requirements, which optimises asset lives and life-cycle cost to delivery levels of service, safety and costs that are in the long term interests of consumers.

Icon Water has estimated that on average and over the life of its assets, 1.15 per cent of capital additions will lead to operating maintenance expenditure. This proportion represents the anticipated cost of asset maintenance as a proportion of the total replacement asset value (excluding dams). The historical expenditure profile for all maintenance equates to 1.13 per cent of replacement asset value. Icon Water has assumed a rate of 1.15 per cent (rather than 1.13 per cent) should apply to the next regulatory period because of an anticipated increase in Icon Water's program of major maintenance.

Icon Water estimated for both the water and sewerage business the percentage that base-year opex would need to increase each year in the 2018–23 regulatory period to account for growth. Icon Water calculated a contingency for asset growth based on cumulative capital additions. Icon Water then added the marginal change in this contingency to the preceding year's base-year opex + asset growth amount, to derive percentage changes in opex arising from growth (Table 4-7 and Table 4-8). These percentage changes were incorporated into the rate-of-change formula used to derive a forecast of controllable opex for each year of the 2018–23 regulatory period.

Icon Water also included an efficiency factor in the base step trend derivation of controllable opex for water and sewerage. An annual efficiency factor of 1.75 per cent has been estimated. This is based on various business restructures in the current regulatory period that are expected to yield cost savings during the 2018–23 regulatory period (section 3.2.1). It is also consistent with the NSW Independent Pricing & Regulatory Tribunal's recent decision on catch-up efficiency savings (IPART

[5] Australian Energy Regulator, 2017

[6] Draft report is due for release no later than 12 December 2017

2016). Following analysis of long term historical data, Icon Water notes that productivity in the water, electricity, and gas sector has declined in recent decades.

Table 4-7: Maintenance estimates based on capital additions, water ($million, 2017–18)

	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23
Base-year escalated maintenance	16.4	16.5	16.5	16.6	16.7	16.8	17.0
Contingency for asset growth	-	0.1	0.4	0.6	0.9	1.2	1.4
Capital additions (cumulative)	12.5	32.6	51.7	76.4	100.3	122.3	142.2
Contingency for asset growth - marginal	-	0.1	0.2	0.2	0.3	0.3	0.3
Base-year opex + asset growth	59.1	59.3	59.5	59.7	60.0	60.3	60.5
Percentage change		**0.24%**	**0.39%**	**0.37%**	**0.48%**	**0.46%**	**0.42%**

Source: Icon Water analysis.

Table 4-8: Maintenance estimates based on capital additions, sewerage ($million, 2017–18)

	2016–17	2017–18	2018–19	2019–20	2020–21	2021–22	2022–23
Base-year escalated maintenance	20.4	20.4	20.5	20.6	20.7	20.9	21.1
Contingency for asset growth	-	0.1	0.5	0.9	1.1	1.4	1.7
Capital additions (cumulative)	12.5	45.2	76.1	97.6	119.2	143.6	169.8
Contingency for asset growth - marginal	-	0.1	0.4	0.4	0.2	0.2	0.3
Base-year opex + asset growth	70.2	70.3	70.7	71.1	71.3	71.6	71.9
Percentage change		**0.20%**	**0.54%**	**0.50%**	**0.35%**	**0.35%**	**0.39%**

Source: Icon Water analysis.

4.7 Forecast of controllable opex, by category

Icon Water's total forecast controllable opex, by category, for the 2018–23 regulatory period is outlined in this section. Details are provided in relation to each opex driver as well as specific consideration taken into account when forecasting opex.

4.7.1 Maintenance

Maintenance expenditure is driven by the mix of assets in service and their condition. The condition of assets to be maintained is dependent on both their age and how well they have been maintained.

Icon Water's maintenance strategy is set out in the Strategic Asset Management Plan (SAMP) and detailed in nine Asset Management Plans (AMPs). The AMPs are the outcome of ongoing detailed planning and analysis and are included in Appendix 2 of Attachment 5: Asset Management and Governance. The SAMP and AMPs are the basis for ensuring compliance with applicable legislation, including the *Utilities Act 2000*[7], *Consumer Protection Code*[8], occupational health and safety legislation, public safety and environmental legislation and other regulatory requirements.

Icon Water is forecasting total maintenance expenditure in the 2018–23 regulatory period will be $185.4 million, which is 2.6 per cent per cent higher than in the 2013–18 regulatory period (Table 4-9). There are no step changes relating to maintenance in the forecast period.

Table 4-9: Forecast maintenance expenditure ($million, 2017–18)

	2018–19	2019–20	2020-21	2021–22	2022–23	Total
- water	16.7	16.6	16.5	16.4	16.4	82.7
- sewerage	20.8	20.6	20.5	20.4	20.3	102.7
Total maintenance	**37.5**	**37.2**	**37.0**	**36.8**	**36.7**	**185.4**

Source: Icon Water analysis.

4.7.2 Operations

Operations expenditure consists of those costs associated with network and treatment plant management, including systems operation and control, support systems, planning and control and operation of treatment plants. Consideration has been given to compliance with all applicable legislation and the existing and new requirements of the ACT Utilities Technical Regulator and the ICRC that could have an impact on costs.

Icon Water is forecasting that total operations expenditure in the 2018–23 regulatory period will be $178.9 million, which is 1.6 per cent lower than in the 2013–18 regulatory period (Table 4-10). There are no step changes relating to operations in the forecast period.

[7] ACT Government, 2000

[8] ACT Government 2012

Table 4-10: Forecast operations expenditure ($million, 2017–18)

	2018–19	2019–20	2020-21	2021–22	2022–23	Total
- water	14.2	13.9	13.8	13.8	13.7	69.3
- sewerage	22.5	22.0	21.8	21.7	21.6	109.6
Total operations	**36.6**	**35.9**	**35.6**	**35.4**	**35.3**	**178.9**

Source: Icon Water analysis.

4.7.3 Planning and strategic management

Planning and strategic management incorporates all activities which provide strategic direction and planning, asset management and business support, or management of Icon Water's water and sewerage services. These costs include the use of expert resources to manage emerging legislative and operational issues associated with the water and sewerage networks in the ACT. This includes scientific research and environmental impact analysis, and identifying the future water and sewerage needs of Canberra's population.

When developing the forecast for future planning and strategic management expenditure, Icon Water has given consideration to compliance with all applicable legislation and existing and new requirements of the ACT Utilities Technical Regulator and the ICRC that could have an impact on costs.

Icon Water is forecasting that total planning and strategic management expenditure in the 2018–23 regulatory period will be $89.8 million, which is 4.3 per cent higher than in the current regulatory period (Table 4-11). There are no step changes relating to planning and strategic management in the forecast period.

Table 4-11: Forecast planning and strategic management expenditure ($million, 2017–18)

	2018–19	2019–20	2020-21	2021–22	2022–23	Total
- water	10.7	10.6	10.6	10.5	10.4	52.8
- sewerage	7.5	7.4	7.4	7.4	7.3	37.0
Total planning and strategic management	**18.2**	**18.1**	**17.9**	**17.8**	**17.8**	**89.8**

Source: Icon Water analysis.

4.7.4 Customer and Corporate services

Customer and corporate services expenses relate to the provision of customer account services, billing services, collection services and corporate functions, including finance, legal, human resources, and economic advice through agreements with ActewAGL.

The forecasting adopted for customer and corporate services in the next regulatory period assumes that ActewAGL will deliver further efficiency improvements over time to be passed through to Icon Water.

Icon Water is forecasting that corporate expenditure in the 2018–23 regulatory period will be $202.0 million, which is 20 per cent lower than in the 2013–18 regulatory period (Table 4-12). This forecast includes the increased value of corporate services step changes relating to the preparation of regulatory submissions.

Table 4-12: Forecast corporate expenditure ($million, 2017–18)

	2018–19	2019–20	2020-21	2021–22	2022–23	Total
- water	18.6	18.5	18.4	19.8	19.6	94.9
- sewerage	21.0	20.9	20.8	22.4	22.1	107.1
Total corporate	**39.6**	**39.3**	**39.2**	**42.2**	**41.7**	**202.0**

Source: Icon Water analysis.

4.8 Forecast of non-controllable opex, by category

For non-controllable cost categories where future forecasts are not necessarily expected to reflect base-year opex, Icon Water has adopted forecasts based on assumptions specific to these categories for the purpose of forecasting costs. Non-controllable costs relate to charges and taxes imposed on Icon Water by the ACT Government. These are principally the WAC and the UNFT. The forecasting approach adopted for expenditure on jurisdictional charges is based on:

- forecast dam releases for each year of the next regulatory period
- forecast length of the water and sewerage networks for each year of the next regulatory period
- the rate of the WAC in the ACT Government budget papers over the forward years
- the rate of the UNFT in the ACT Government budget papers over the forward years.

Icon Water forecasts a real increase in expenditure on non-controllable costs over the 2018–23 regulatory period. For UNFT and the WAC, Icon Water proposes to continue to make annual adjustments such that variations between estimated and actual costs can continue to be passed through by way of annual tariff variations.

4.8.1 Water Abstraction Charge

The WAC is a fee charged to Icon Water by the ACT Government for each kilolitre of water abstracted for the purposes of urban water supply.

The WAC reflects the value of a scarce natural resource vested in the ACT Government; including offsetting costs incurred by the Territory, providing a return on a valuable and scarce resource, and assisting in managing demand.[9]

In 2015–16, the WAC was set at $0.55 per kilolitre for licensees taking water for urban water supply[10]. In the 2015–16 Budget Review, the ACT Government stated it will index the WAC by two percent per annum commencing in 2016–17.[11] The ACT Government increased the indexation of the WAC from two to three per cent in the 2016–17 Budget commencing 1 July 2017[12]. The 2015–16 WAC fee and the Government's announcements on indexing are used to calculate the WAC per kilolitre for the 2018–23 regulatory period.

[9] Environment, Planning and Sustainable Development Directorate, 2010.

[10] Icon Water, 2017.

[11] ACT Government, 2015: 37.

[12] ACT Government, 2016: 44.

The WAC per kilolitre is multiplied by forecast release volumes to calculate the total value of the WAC for each year of the 2018–23 regulatory period. The estimation of forecast release volumes is discussed in Attachment 4. The indexed WAC per kilolitre, forecast release volumes and the total value of the WAC are presented in Table 4-13 and Table 4-14.

Table 4-13: Water Abstraction Charges ($million, nominal)

	2018–19	2019–20	2020-21	2021–22	2022–23
WAC per kilolitre	0.60	0.61	0.63	0.65	0.67
Forecast dam releases (GL)	48.84	49.18	49.50	49.97	50.41
Total WAC	**29.07**	**30.15**	**31.25**	**32.50**	**33.77**

Source: Icon Water analysis.

Table 4-14: Water Abstraction Charges ($million, 2017–18)

	2018–19	2019–20	2020-21	2021–22	2022–23
WAC per kilolitre	0.59	0.58	0.59	0.59	0.59
Forecast dam releases (GL)	48.84	49.18	49.50	49.97	50.41
Total WAC	**28.59**	**28.55**	**28.96**	**29.43**	**29.85**

Source: Icon Water analysis.

4.8.2 Utilities Network Facilities Tax

The UNFT is payable by the owners of any network facility on land in the ACT. A network facility is any part of the infrastructure of a utility network not fixed to land subject to a lease, a license granted by the Territory or any right prescribed by regulation. The tax amount payable is calculated by multiplying the determined rate by the linear route length of the network. For the year ending 31 March 2016, the determined rate is $1,042.[13]

In the 2015–16 Budget Review, the ACT Government stated it would index the UNFT by an additional five per cent for the year ending March 2017 (a total increase of 10 per cent).[14] Further, it stated that the UNFT will revert to five per cent indexation from 2017—18, which was confirmed in the 2016–17 Budget review for 2018–19 and 2019–20.[15] Icon Water's estimates of the UNFT for the 2018–23 regulatory period are set out below in Table 4-15 Table 4-16.

[13] See www.revenue.act.gov.au.

[14] ACT Government, 2015: 37.

[15] ACT Government, 2016: 43.

Table 4-15: Utilities Network Facilities Tax ($million, nominal)

	2018–19	2019–20	2020-21	2021–22	2022–23
Water	5.67	6.02	$.39	6.78	7.19
Sewerage	4.65	4.94	4.94	5.24	5.56
Total	**10.32**	**10.96**	**11.32**	**12.02**	**12.76**

Source: Icon Water analysis.

Table 4-16: Utilities Network Facilities Tax ($million, 2017–18)

	2018–19f	2019–20f	2020-21f	2021–22f	2022–23f
Water	5.53	5.73	5.93	6.14	6.35
Sewerage	4.54	4.70	4.59	4.75	4.91
Total	**10.07**	**10.43**	**10.51**	**10.89**	**11.28**

Source: Icon Water analysis.

Box 4-2: Approach to the treatment of pass-through events in 2016–17 and 2017–18

The ICRC is currently required to undertake an annual price adjustment process to determine the maximum price Icon Water can charge for its regulated water, sewerage and miscellaneous services in 2015–16, 2016–17 and 2017–18. Prices are adjusted for inflation and to incorporate the effect of any approved pass-through events.

The inflation adjustment is a straightforward exercise that involves adjusting the current price (in year t) by the change in the CPI to get the price for the following year (t + 1). The Commission undertakes the calculations and notifies Icon Water on 1 June for each of the three years of the price direction.

Pass-through calculations refer to adjustments made to prices in year t, which reflect the difference between forecast and actual outcomes relating to pass-through events from year t-2. Three such events that are almost certain to be triggered every year: the Water Abstraction Charge, the Utilities Network Facilities Tax and Commonwealth Subvention payments. For example, prices set for the 2017–18 year reflect adjustments for the difference between the forecast amounts for pass-through events in 2015–16, and the amounts that actually occurred in 2015–16.

Icon Water proposes to finalise the pass-through claims for the current regulatory period in June 2018, by supplying the ICRC with actual data relating to 2016–17 and estimated data for 2017–18. In Icon Water's view, the estimated data for 2017–18 would be highly reliable, as it would be based on 11 months of actual data and an estimate for the month of June only. Icon Water would then add the total amount to be passed through to customers from the 16–17 and 17–18 years to the uncontrollable revenue allowance in the first year of the next regulatory period.

Appendix 1 Report on Expected Wage, Electricity and Construction Price Changes to 2022–23

This report is attached as a separate pdf document.

Abbreviations and acronyms

AAD	ActewAGL Distribution
ACT	Australian Capital Territory
BOM	Bureau of Meteorology
BTP	Business Transformation Program
CSA	Corporate Service Agreement
FTE	Full Time Equivalent
GL	gigalitre (one thousand megalitres)
ICRC	Independent Competition and Regulatory Commission
kL	kilolitre (one thousand litres)
km	kilometre (one thousand metres)
ML	megalitre (one thousand kilolitres)
PDOM	Project Delivery Operations and Maintenance
UNFT	Utilities Network Facilities Tax
WAC	Water Abstraction Charge

References

ACT Government (1997). Independent Competition and Regulatory Commission Act 1997 (ACT)

ACT Government (2000). Utilities Act 2000 (ACT)

ACT Government (2012). Utilities (Consumer Protection Code) Determination 2012 (ACT)

ACT Government (2015). Australian Capital Territory Budget 2015–16 Budget Review, Chief Minister, Territory and Economic Directorate.

ACT Government (2016). Australian Capital Territory Budget 2016–17 Budget Review, Chief Minister, Territory and Economic Directorate.

Australian Energy Regulator (2017). Weekly Volume Weighted Average Spot Prices. Retrieved 22.6.17 from https://www.aer.gov.au/wholesale-markets/wholesale-statistics/weekly-volume-weighted-average-spot-prices

Bureau of Meteorology (2017). National Performance Report 2015–16 – Urban Water Utilities, The Complete Dataset, 18.5.17.

Environment, Planning and Sustainable Development Directorate (2010). ACT Water Abstraction Charge, 22.6.17

Icon Water (2017). Water Abstraction Charge. Retrieved 22.6.17 from https://www.iconwater.com.au/My-Home/My-account/Pricing-and-your-Customer-Contract/ACT-network-water-prices/Water-Abstraction-Charge.aspx

ICRC (2013). Final Report Regulated Water and Sewerage Services 1 July 2013 to 30 June 2019. Canberra, ICRC. **Report 5 of 2013**.

ICRC (2015). Technical paper: Water demand forecasting: Regulated water and sewerage services - Biennial recalibration 2015. Canberra, Independent Competition and Regulatory Commission.

IPART (2016). Review of prices for Sydney Water Corporation From 1 July 2016 to 30 June 2020 Water — Final Report, June. NSW.