Attachment 7

Capital expenditure

30 June 2022

Table of contents

List of tables

List of figures

List of boxes

7.1 Introduction

This attachment sets out Icon Water's capital expenditure (capex) program delivered over the 2018–23 regulatory period against the forecast used by the Independent Competition and Regulatory Commission (the Commission) in its 2018 final decision, and the investment program planned for the 2023–28 regulatory period.

Box 7-1: Key points

- Actual prudent capex investment by Icon Water in water and wastewater assets during the 2018–23 regulatory period will amount to $487.0 million ($2022–23), including $187.8 million for water services and $299.2 million for wastewater services. This includes $79.4 million invested in non-system assets, which is allocated between water and wastewater services.[1] This is $43.8 million or 9.9 per cent higher than the forecast allowed by the Commission as a result of prudent investments in renewal projects for ageing critical infrastructure, and projects required to meet regulatory requirements.
- Icon Water's forecast gross capex over the 2023–28 regulatory period is $702.0 million or $671.7 million net of capital contributions, including $225.8 million for investment in water service assets and $476.3 million for wastewater service assets. This includes a $95.6 million investment in non-system assets.
- Around 35 per cent of Icon Water's forecast capex over the 2023–28 regulatory period is made up of two large projects at the Lower Molonglo Water Quality Control Centre (LMWQCC). The Biosolids Management Renewal and Secondary Treatment Bioreactors Capacity Upgrade projects are critical investments that will ensure the facility can continue to support the region's wastewater network needs as the population grows.
- This program reflects the investment needed by Icon Water over the next five years to renew infrastructure to maintain service standards, expand the network to support growth in the Australian Capital Territory (ACT), improve assets and invest in ICT capital for the future.
- Icon Water continued to improve its planning and delivery of projects over the 2018–23 regulatory period in line with industry best practice asset management and has been recognised for this by the Water Service Association of Australia and industry peers. Icon Water will continue to drive improvements in asset management and governance practices as outlined in **Attachment 5: Asset management governance**.

Over the 2018–23 regulatory period, Icon Water has focused on renewing critical infrastructure and meeting the challenge of providing water and wastewater services to the ACT's growing population. We have improved our planning process and system delivery capabilities through investments in major ICT system renewals.

The 2023–28 regulatory period will see Icon Water maintain focus on the renewal of critical infrastructure in response to the outcomes of condition assessments on existing ageing assets. This will ensure service standards are maintained for customers and supports growth in the region. The two largest projects for the regulatory period, both at LMWQCC, are inter-generational investments to ensure the facility can continue to support the region's wastewater network now and into the future.

[1] Icon Water's non-system assets include information and communication technology (ICT), fleet and equipment, land and buildings and other assets not directly part of the water and wastewater network.

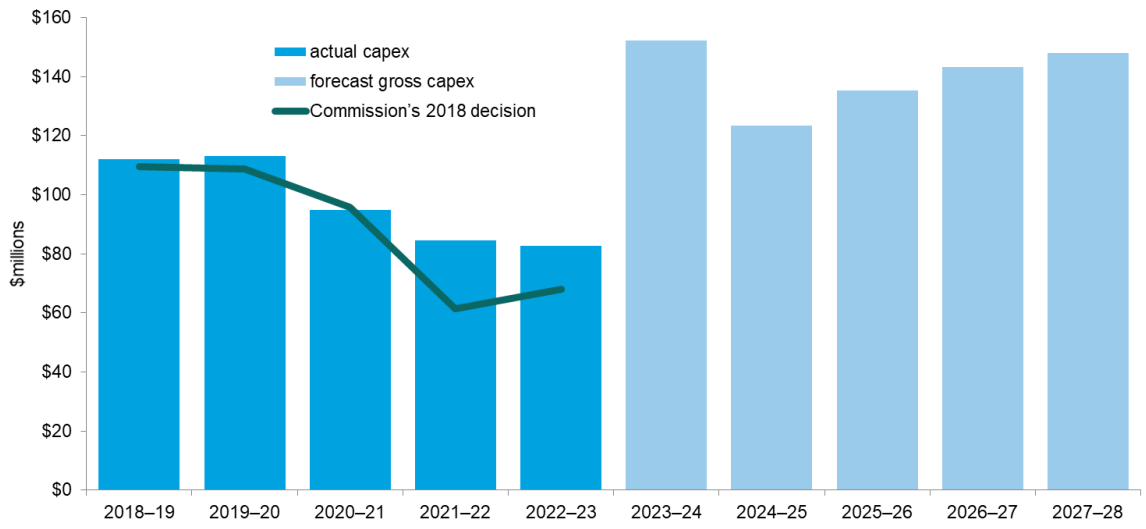
Table 7-1: Customer and community engagement feedback

What we heard	Our response
The community agrees with the need to plan for the future, this includes investing in water security and exploring alternative water sources	In the 2023–28 regulatory period, 31 percent of our total capital investment plan has a primary driver of **growth**. Growth projects create new assets or upgrade existing assets beyond their original capacity or performance. These investments are required in response to changes in usage, customer expectations or anticipated future needs, to ensure Icon Water can provide safe and reliable services to the region's growing population. The LMWQCC Secondary Treatment Bioreactors upgrade will be our largest project in the 2023–28 regulatory period. Our current secondary treatment bioreactors are approaching capacity. The project will deliver the required expansion to accommodate Canberra's population growth and help us protect the region's waterways for future generations. Our investment in growth includes $32.7 million which is co-funded by developers as part of the Capital Contributions Code. These projects address constraints in existing infrastructure caused by infill growth in established areas. Our 2023–28 investment plan includes a number of capital contributions projects including the North Canberra Sewer Augmentation (required to support future growth in the North Canberra region) and the Fyshwick Sewer Pump Station Augmentation (required to support future growth in the Fyshwick and Eastlake areas). In the 2023–28 regulatory period, we will make investments in a number of existing assets that are critical to our water security, such as upgrades to the Cotter Pump Station. While we do not have any projected capital expenditure exploring alternative water sources for the 2023–28 regulatory period, we will continue to undertake planning and forecasting activities (which are operational expenditure) to inform our future investment in water security and alternative water sources. Delivery of our Digital Strategy (2021–28) will also ensure we have the technology to support continued efficient service delivery and improve the customer experience. Key capital investments for 2023–28 include an enterprise resource planning (ERP) capability that will automate manual processes to provide stronger governance, increased accuracy and enhanced transparency.
There is community support for achieving greater environmental sustainability and accelerating net zero while limiting impact on customer prices	In the 2023–28 regulatory period environmental sustainability will form a critical part of a number of projects. As part of the LMWQCC Biosolids Management Renewal project (to replace the existing furnaces) our options assessment includes the potential to recover energy and resources, to reuse products, and environmental and sustainability opportunities. Other projects such as the North Canberra Sewer Augmentation are important for protecting the environment from wet weather overflows.
The community is committed to Icon Water maintaining quality and reliable core services and is willing to pay something towards reducing interruptions or issues for those who experience them more than usual	A significant proportion of our assets were built in the 1960s and 1970s and many of these assets are now reaching the end of their economic and engineering life and need to be replaced. This investment is significant, with 63 percent of our total capital investment plan for the 2023–28 regulatory period having a primary driver of **renewal**. This investment is driven by asset condition, performance and compliance requirements relating to safety, levels of service and asset protection. Our ongoing renewals programs include water meters, water mains, sewer mains and reservoir replacements. How we deliver these programs in the 2023–28 regulatory period has considered customer values and expectations, as outlined in **Attachment 2: Customer and community engagement**.
Affordability should underpin any investment decision. If we need to invest to avoid causing issues in the future, we will consider support for vulnerable customers and other impacted customer segments	In developing our investment plan for the 2023–28 regulatory period, we undertook a review process to test the prudency, efficiency and sharing of risk between Icon Water and customers for projects. This review process also considered the risks (including on asset performance) associated with project delays. Based on this assessment, we decided to reduce our investment plan by $70 million in capital expenditure (so this expenditure is not passed onto customers through prices in the 2023–28 regulatory period).

What we heard	Our response
The community considers Icon Water an essential service provider. To be a valued partner in the community they want us to be more visible – this means being targeted in our partnering initiatives, education and supporting activities, and proactively talking about it with the community.	We will engage with the ACT community on key projects in the 2023–28 regulatory period, to hear and address customer concerns and expectations. This will include engagement on: • LMWQCC Biosolids Management Renewal project – to replace the existing furnaces • water reservoir renewal activities – including replacement of the Lower Red Hill reservoir • sewer augmentation activities – including the North Canberra Sewer Augmentation

Figure 7-1 shows Icon Water's actual and forecast capex against the Commission's decision over the 2018–23 regulatory period, together with the proposed forecast for the 2023–28 regulatory period. The forecast capex for 2023–28 is $215.0 million or 44.2 per cent higher than the program in the 2018–23 regulatory period in real terms ($2022–23). When forecast capital contributions are deducted, the program is 37.9 per cent higher.

Figure 7-1: Icon Water's capex actual and forecast 2018–19 to 2028–29 ($millions, 2022–23)



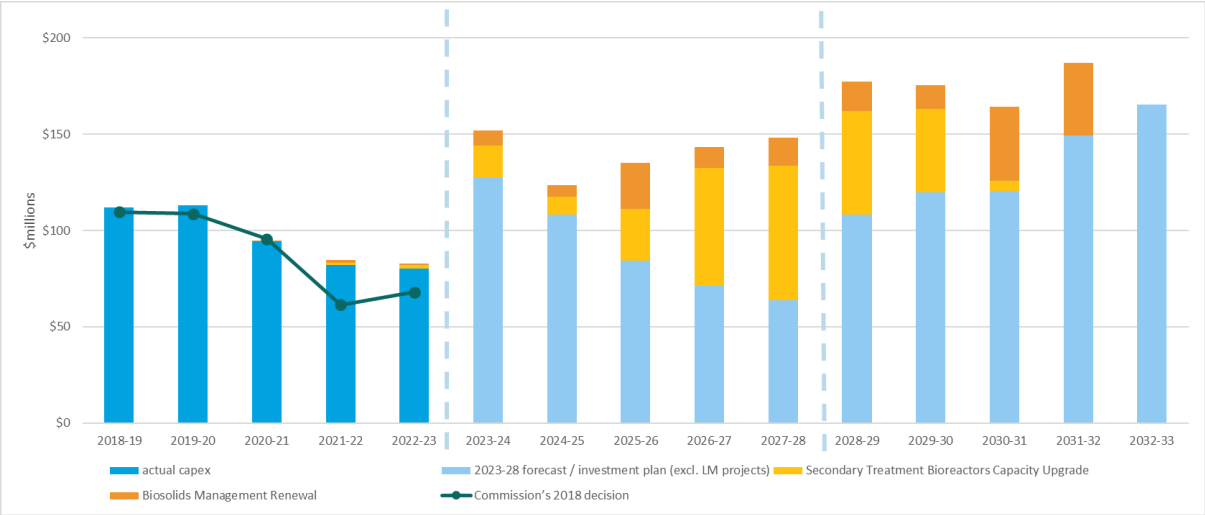
Source: Icon Water.
Note: 2022–23 capex is forecast based on Icon Water's Investment Plan.

7.1.1 Long term capex forecast

Icon Water undertakes long term capex forecasting to ensure it has planned for and has capacity to deliver its capex program in a prudent and efficient manner. As explained in **Attachment 5: Asset management governance**, Icon Water undertakes long-term asset management planning to develop indicative forecasts of capital works required based on the age profile of its asset base, and assumptions about asset condition and growth in demand for services.

Figure 7-2 shows Icon Water's actual and forecast capex over 15 years from 2018–19 to 2032–33. The figure highlights the impact of the Biosolids Management Renewal and Secondary Treatment Bioreactors Capacity Upgrade at LMWQCC, which are explained further below.

Figure 7-2: Icon Water's long-term forecast, highlighting selected projects ($millions, 2022–23)



Source: Icon Water.

7.1.2 Renewal and upgrade works at Lower Molonglo Water Quality Control Centre

Icon Water's capex forecast includes works on two large projects at LMWQCC. The Biosolids Management Renewal and Secondary Treatment Bioreactors Capacity Upgrade projects are critical investments that will ensure the facility can continue to support the region's wastewater network needs as the population grows.

The two projects will predominately be delivered in the 2023–28 regulatory period, with extensive planning for both projects underway. We undertook an internal challenge process to test the prudency, efficiency and sharing of risk between Icon Water and customers for both projects.

This process found a small chance that potential delays outside Icon Water's control, such as delays in receiving development applications or environmental approvals, or supplier issues, could delay the delivery of either project by up to six months. A delay of this magnitude could shift approximately $70 million of forecast capital expenditure from the 2023–28 regulatory period into the 2028–33 regulatory period.

In response to this assessment, Icon Water considers the most reasonable approach is to omit this portion of the project's costs from our 2023–28 regulatory submission to minimise the up-front impact on customers. If the projects move forward as anticipated and the full project cost is realised in the 2023–28 regulatory period, we intend to submit this prudent and efficient capex for ex-post review in our next regulatory submission. Table 7-2 outlines the percentage of works that will be completed in each regulatory period over the life of the projects.

Table 7-2: Cost of LMWQCC major projects (2022–23)

	2018–23	2023–28	2028–33
Biosolids Management Renewal	2%	84%	14%
Secondary Treatment Bioreactors	4%	57%	39%

Source: Icon Water.

Further information on both projects is provides in Box 7-2 and Box 7-3.

Box 7-2: LMWQCC Biosolids Management Renewal

Icon Water owns and operates LMWQCC – the treatment plant processes most of Canberra's wastewater and is the largest inland sewage treatment plant in Australia. LMWQCC treats Canberra's wastewater to a high quality, releasing treated water back to the environment via the Molonglo River. We also beneficially reuse the sewage solids removed from the process, generating a high value soil conditioner known as Agri-Ash.

Wastewater is received at the plant from homes and businesses across Canberra through the sewage network. The wastewater is separated into liquid and solids, and solids are currently thermally treated in one of two furnaces. Heat treatment provides destruction of pathogens and contaminants but allows the ash to retain elements of lime and phosphorus which are beneficial soil enhancers. Heat treatment also reduces moisture content, making transportation of the material to nearby agricultural regions more efficient and economical. On average, the Agri-Ash is collected three days per week for distribution as a soil conditioner.

LMWQCC was built in the 1970s and its furnaces are now over 45 years old and are reaching their end of service life. A renewal project was completed in the 2018–23 regulatory period to extend the lifespan of the asset and give time to holistically reassess how we treat biosolids by exploring available technologies to determine what may best serve Canberra into the future.

We are seeking environmentally sustainable and energy efficient technology to service our growing community over the next 50 years. We have consulted with a range of experts and industry counterparts globally to become informed of technological advancements in wastewater solids processing and identify a short list of options for replacing the existing furnaces. These options look to provide reliability of service that will allow us to continue to protect human health and the environment, and maximise resource recovery from the process.

Since the project started in 2018, options for technology that best suit the needs of Icon Water and the community have been thoroughly investigated. Five options have been shortlisted, including:

- Option 1 – Fluidised Bed Combustion (FBC)
- Options 2, 3 and 4 – Mesophilic Anaerobic Digestion
- Option 5 – Gasification.

The shortlisted options are being subjected to a rigorous assessment through a multi-criteria analysis. The key criteria considers performance against solids processing; reliability, operability and maintainability; circular economy; future proofing; and environmental impacts.

The new treatment solution will need to be integrated into the existing site and work with other treatment components of the plant. Given the scale, complexity and critical function of this infrastructure, work is planned to commence prior to the expected end of service life to ensure continuity of service and allow time for planning, design and construction. The new biosolids treatment solution will be in place by 2030.

Box 7-3: LMWQCC Secondary Treatment Bioreactors Capacity Upgrade

The Secondary Treatment Upgrade Project is investigating options to upgrade the secondary biological treatment process at LMWQCC. This part of the treatment process removes nitrogen, nitrates and dissolved oxygen so that the discharge has minimal environmental impacts.

The existing secondary treatment process is approaching capacity and requires expansion to cater for the projected population growth outlined in the Icon Water Wastewater System Strategy 2020-2070.

The project is currently investigating different treatment technology options for upgrading the site in a staged approach to meet projected growth. A list of nine different treatment options have been investigated by design consultants, including high level layouts and costings. A multi-criteria analysis process, which included representation from across the Icon Water business, has been completed to shortlist the treatment options to four technologies.

The shortlisted options under development are:

- Option 1 – Conversion of existing reactors to Membrane Bioreactor (MBR)
- Option 3 – Duplication of the existing process (with upgraded technology)
- Option 4 – Aerobic Granular Sludge (Nereda ®)
- Option 5 – Integrated Fixed Film Activated Sludge (IFAS)

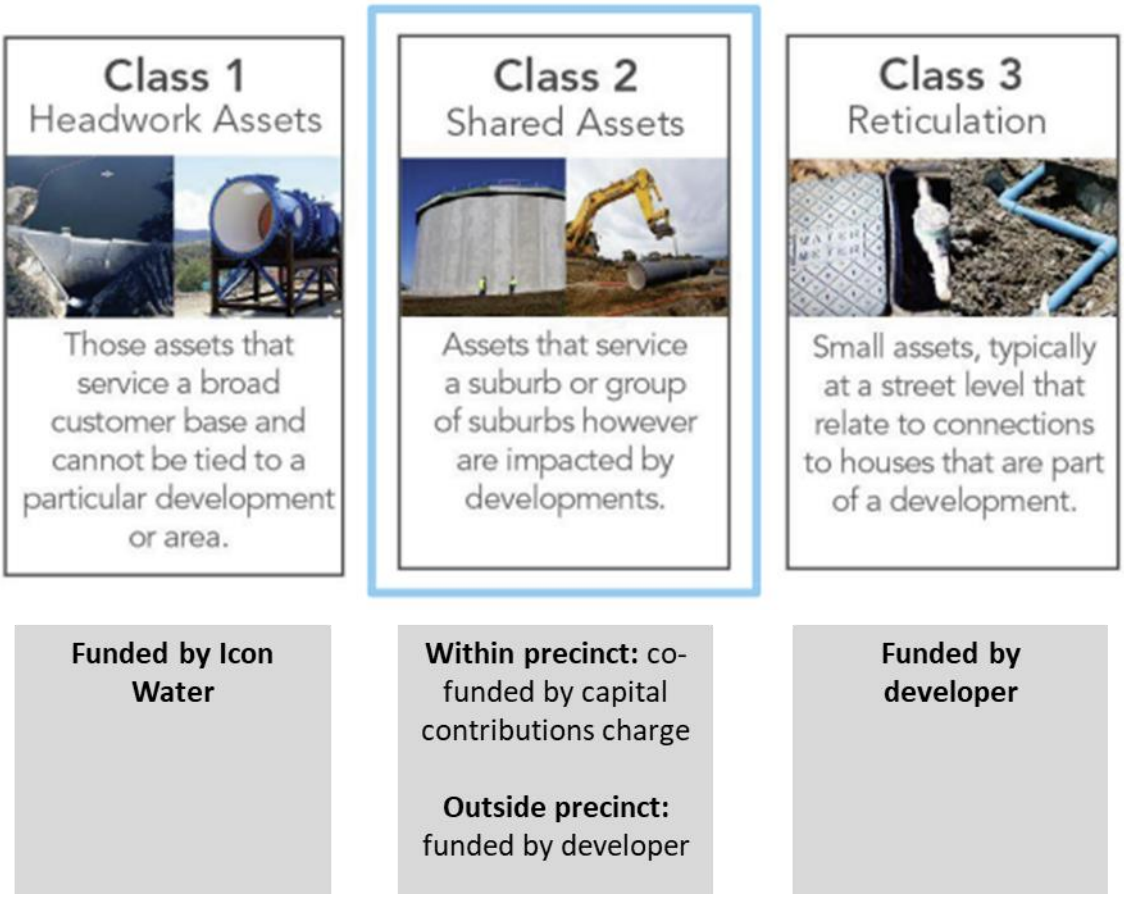
These shortlisted options are being further developed and costings refined before going through a second MCA process to select a preferred option.

The project to investigate different treatment technology options commenced in 2017. Construction of the preferred approach is expected to commence in 2026, with the majority of the works expected to occur in 2027 and 2028.

7.1.3 Capital contributions

On 1 January 2018, the Commission introduced the Water and Sewerage Capital Contribution Code which sets out the framework for how 'growth' projects will be funded from 1 January 2018. Figure 7-3 shows the funding arrangements defined in the Code, and highlights Class 2 Shared Assets that are co-funded by capital contributions charges.

Figure 7-3: Icon Water's asset classifications



Source: Icon Water

The investment plan outlined in this Attachment includes projects related to Class 1 upgrades and Class 2 infrastructure upgrades 'within precinct' that are co-funded by the capital contributions charge. Further information on capital contributions is provided in section 7.6.2. The Commission has advised they will review our capital expenditure and projects associated with calculation of the precinct charge during their 2023–28 price investigation. They will also account for any contributions received to ensure projects funded by the Code are not funded again through water and wastewater tariffs.

7.2 Historical capex 2018–23

Box 7-4: Summary of capex 2018–23

- Actual prudent capex investment by Icon Water in water and wastewater assets during the 2018–23 regulatory period will amount to $487.0 million ($2022–23), including $187.8 million for water services and $299.2 million for wastewater services.
- This is forecast to be $43.8 million or 9.9 per cent above the allowance set by the Commission, which is a result of:
    - the addition of unforeseen projects, including projects that were brought forward from the 2023–28 regulatory period. These are primarily projects on assets that were showing accelerated deterioration or prioritised ICT projects on which there are future dependencies
    - increases in the scope of some projects during their development and implementation
    - cost increases in some projects due to market conditions and limitations of early project estimates
    - delays in the delivery of some projects that that were expected to occur prior to 2017–18 but saw expenditure in the current regulatory period.
- Increased expenditure above the allowance was offset by efforts to find efficiencies in the delivery of some projects, and to defer other lower priority projects to the next regulatory period.
- We continued major ICT system renewal to replace aged and unsupported systems and drive business efficiencies over the long term. We have implemented key ICT capabilities such as the Works and Asset Management System, new Data Historian Platform and new Fleet Management System. These capabilities set the foundations to refine and integrate our asset data, enhance our cyber security maturity, maximise asset performance and deliver a more seamless, trusted and productive customer experience.
- We continued to make significant improvements in the planning and delivery of projects over the 2018–23 regulatory period to work towards industry best practice asset management.

7.2.1 Overview

The Commission's 2018 final decision allowed for capex of $443.2 million ($2022–23) during the 2018–23 regulatory period. This decision was based on Icon Water's substantially revised forecast capex that balanced cost, risk and performance, while continuing to deliver safe and reliable water and wastewater services.

Icon Water's actual forecast capex for the 2018–23 regulatory period is $487.0 million. The breakdown of this between water and wastewater investment and by year is shown in Table 7-3.

Table 7-3: Icon Water's 2018–23 capex against the Commission's 2018 decision ($millions, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Water						
Commission's 2018 decision	$36.3	$51.6	$43.1	$29.2	$24.3	$184.5
Actual / forecast	$39.7	$52.7	$42.0	$25.1	$28.3	$187.8
Variance	$3.4	$1.1	-$1.1	-$4.0	$4.0	$3.4
% variance	9.4%	2.2%	-2.6%	-13.9%	16.3%	1.8%
Wastewater						
Commission's 2018 decision	$73.3	$57.0	$52.6	$32.2	$43.6	$258.7
Actual / forecast	$72.2	$60.3	$52.8	$59.4	$54.5	$299.2
Variance	-$1.1	$3.2	$0.2	$27.2	$10.9	$40.4
% variance	-1.4%	5.7%	0.3%	84.4%	25.0%	15.6%
Combined total						
Commission's 2018 decision	$109.6	$108.6	$95.7	$61.4	$67.9	$443.2
Actual / forecast	$112.0	$113.0	$94.8	$84.6	$82.7	$487.0
Variance	$2.4	$4.4	-$0.9	$23.1	$14.8	$43.8
% variance	2.2%	4.0%	-1.0%	37.7%	21.9%	9.9%

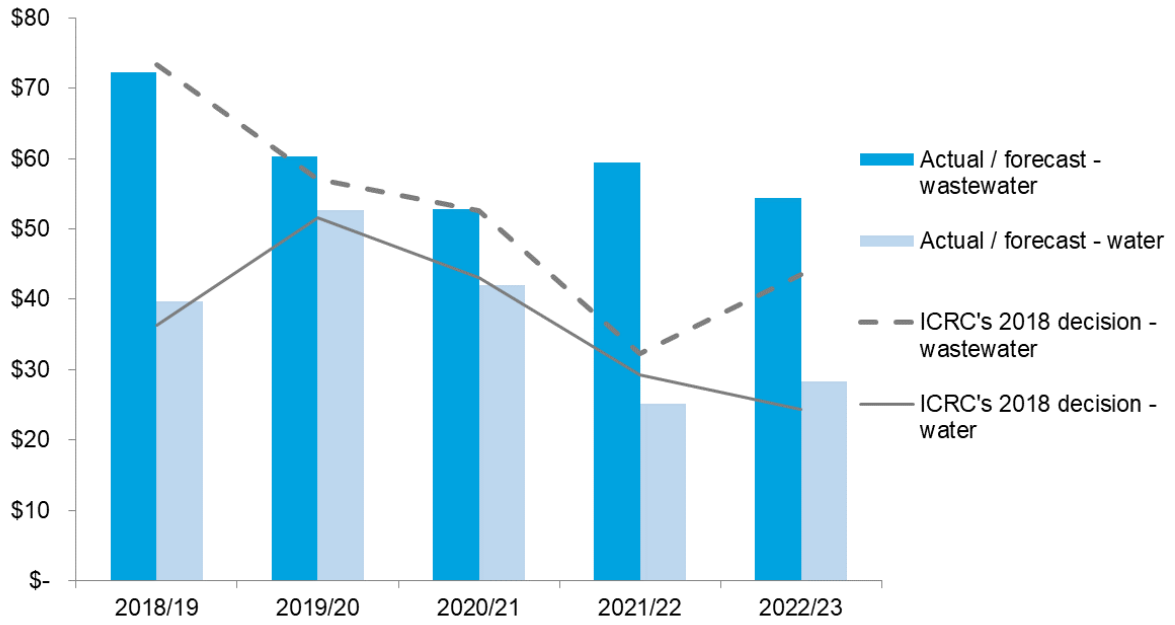
Source: Icon Water.
Note: Totals may not sum due to rounding.

Icon Water's capital program over the 2018–23 regulatory period focused largely on maintaining safe and reliable services to customers through investments in water, wastewater and non-system asset replacement and improvements. This follows a period of significant investment in the region's water security over the previous 10 years, to respond to drought and climate change-related risks. In 2018–23 we continued our investment in water security and increasing resilience of key assets.

Icon Water also delivered water and wastewater projects to meet the region's growing needs in new urban developments and continued to replace ageing and unsupported ICT systems.

Figure 7-4 shows Icon Water's water and wastewater capex spend against the Commission's 2018 decision in each year of the 2018–23 regulatory period.

Figure 7-4: Annual capex for water and wastewater, 2018–23 ($million, 2022–23)



Source: Icon Water.

Icon Water has met the challenge of investing to renew ageing water and wastewater infrastructure that is reaching the end of its useful life. Maintaining and renewing critical infrastructure is vital to meet the region's water security needs and ensure we enable future efficiencies. Approximately 55 per cent of total capex over the regulatory period has been to renew existing assets.

Icon Water's biggest investment over the 2018–23 regulatory period has been major works at LMWQCC to replace ageing assets at risk of failure. This includes renewal of high voltage assets and upgrades to the tertiary filters and disinfection systems.

Icon Water has also undertaken extensive work to renew water mains to ensure adequate flows and reduce the risk of failure.

Works have also been undertaken to augment the trunk sewer system at Belconnen and renew ageing sewer mains that require replacement because they have been identified as being at risk of failure.

The 2018–23 regulatory period has seen Icon Water conclude the significant Business Transformation Program (BTP) that commenced in the prior period. At the start of the 2018–23 regulatory period, business decisions meant that the BTP was dissolved to focus on the core project to upgrade our works and asset management system which was completed in 2018–19. Subsequently we developed and commenced the Digital Strategy (2021–28) focussed on uplifting, optimising and modernising our digital capability from 2021 onwards into the next regulatory period. The Digital Strategy is also serving to support the corporate sourcing strategy, reducing risk and maximising opportunities of the transition from the Corporate Services Agreement (CSA) and Customer Services and Community Support Agreement (CSCSA) to the new sourcing strategy.

7.2.2 Forecast capex in the final two years of the current regulatory period

Icon Water's reported capex during the 2018–23 regulatory period includes actual expenditure up to the end of February 2022 and forecast expenditure for the remainder of the period.

Icon Water's forecast for the final year of the regulatory period is $82.7 million, which is $14.8 million, or 21.9 per cent higher than the Commission's 2018 decision forecast.

Key projects still to be delivered in 2022–23 are remaining works forecast on the High Voltage Asset Renewal project at LMWQCC and the Belconnen Trunk Sewer Augmentation project.

In the final two years of the current regulatory period we have or will begin implementation of key capability ICT roadmaps, including decommissioning of legacy ICT where required for the transition to the new sourcing strategy in 2023.

We have a high degree of confidence in our forecast for the last two years of the current regulatory period because the majority of projects are committed and/or have commenced.

7.2.3 Delivery of the 2018–23 capital program

Icon Water expects to spend 9.9 per cent more than the Commission's 2018 allowance, which includes:

- a 1.8 per cent increase in expenditure on water assets
- a 15.6 per cent increase in expenditure on wastewater assets.

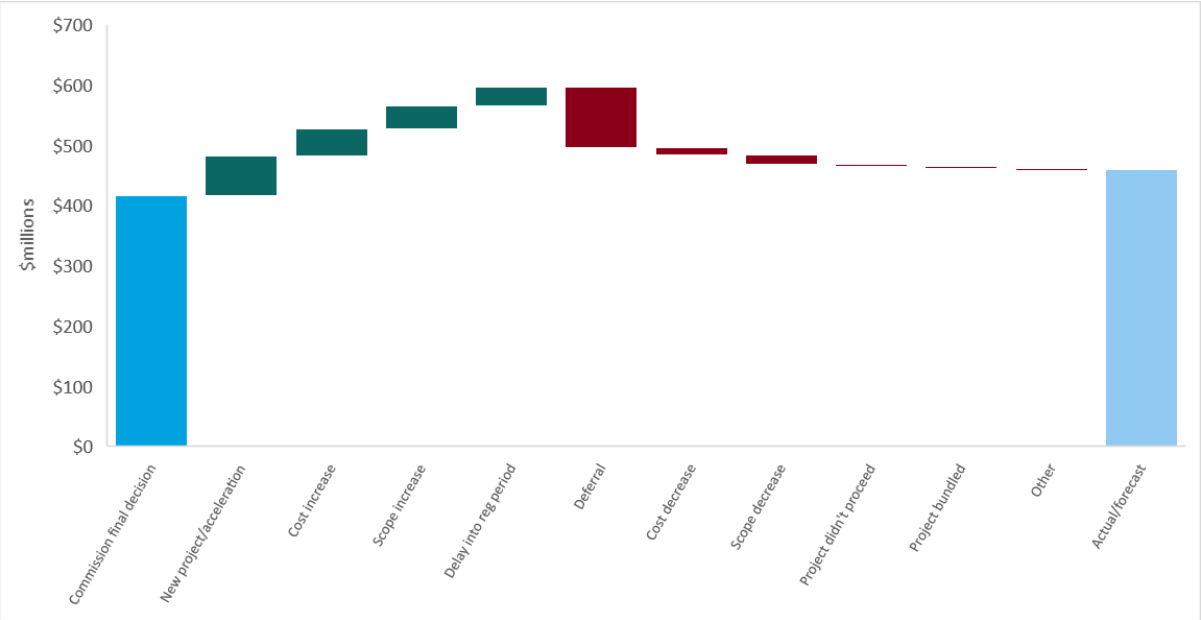
The higher than expected forecast capex program is consistent with the initial regulatory proposal we provided to the Commission for the 2018–23 regulatory period and reflects expenditure on a number of projects that were anticipated, but contained a degree of uncertainty regarding when they would be delivered.

A number of factors underpin Icon Water's proactive risk-based asset management approach, which has contributed to the variance. These factors include:

- the addition of unforeseen projects, including projects that were brought forward from the 2023–28 regulatory period. These were primarily projects on assets that were showing accelerated deterioration or prioritised ICT projects on which on which there are future dependencies
- increases in the scope of some projects during their development and implementation
- cost increase in some projects due to market conditions and limitations of early project estimates
- delays in the delivery of some projects that that were expected to occur prior to 2017–18 but saw expenditure in the current regulatory period.

Figure 7-5 shows the impact of the factors listed above and shows how each have contributed to the variance between the allowance and the forecast actual capex.

Figure 7-5: Drivers of variance between Commission's 2018 decision and actual capex over the 2018–23 period ($million, nominal)



Source: Icon Water.

7.2.4 Cost drivers for capital investment in 2018–23

This section details the cost drivers of the 2018–23 capital investment program. It breaks down the cost drivers into four categories: renewals, growth, efficiency and regulation. Non-system projects which are split across water and wastewater and notionally included in the four categories are also separately identified.

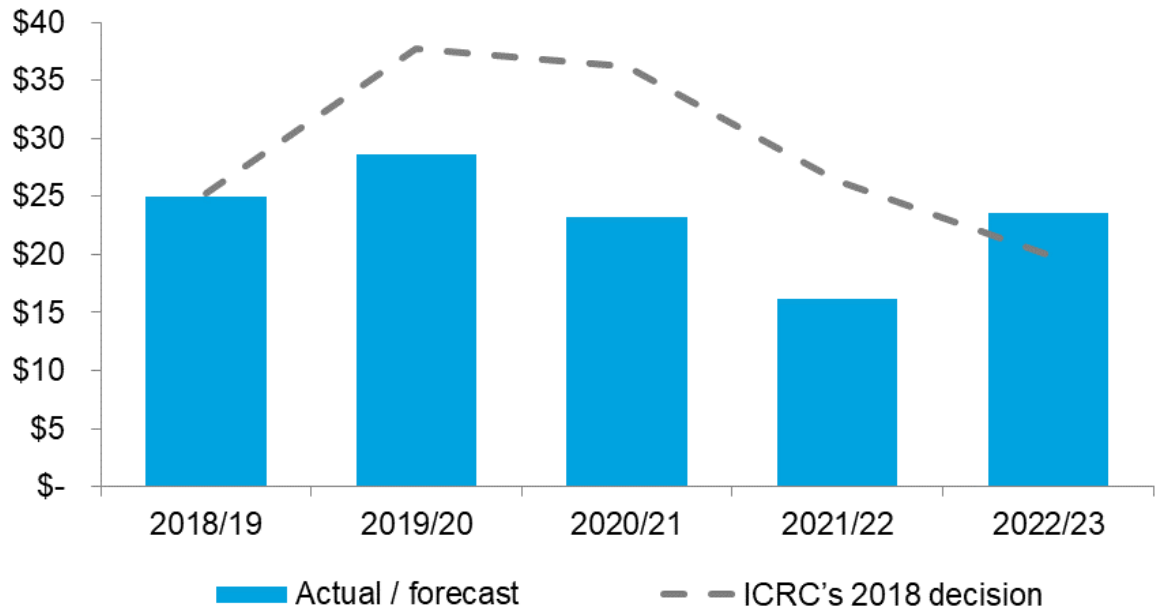
Renewals

Water

Over the 2018–23 regulatory period, Icon Water will have invested $116.7 million in renewals for water assets. These works include renewing and replacing water mains, water meters and property service connections, as well as undertaking upgrades at water treatment plants (WTPs) and water pumping stations. These renewals works ensure that clean drinking water can continue to be supplied to customers at service standards they expect in terms of quality, reliability, pressure and taste.

Figure 7-6 shows Icon Water's expenditure on renewals for water over the 2018–23 period.

Figure 7-6: Renewals capex – water ($million, 2022–23)



Source: Icon Water.

Table 7-4 breaks down Icon Water's expenditure on renewals for water assets by financial year against the Commission's 2018 decision.

Table 7-4: Renewals capex – water ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Commission's 2018 decision	$25.2	$37.7	$36.2	$26.4	$20.0	$145.5
Actual / forecast	$25.0	$28.6	$23.2	$16.2	$23.6	$116.7
Variance	-$0.2	-$9.1	-$13.0	-$10.2	$3.7	-$28.8

Source: Icon Water.
Note: Totals may not sum due to rounding.

The lower than forecast capital expenditure is mainly driven by:

- project savings as a result of lower than forecast contract prices for key projects, including the Mugga Reservoir and O'Conner Reservoir Roof replacements
- lower than anticipated scope of works to renew water mains to maintain the risk of service interruptions at an appropriate level
- a decision to defer a portion of the Water Network EIMC[2] program of works at lower risk sites to offset increased capex on other vital projects.

Key water renewals projects completed during the 2018–23 regulatory period are outlined in Table 7-5.

[2] EIMC stands for electrical, instrumentation, monitoring and control systems.

Table 7-5: Key water renewal projects delivered over 2018–23

Project / program	Project overview and benefits
Water Meter Renewals	Water meters are used to enable accurate billing of customer water consumption and the management of water loss in the water distribution system (water balance) which is essential to Icon Water's business. The water meter fleet, which consists mostly of mechanical meters, wear with use and age. The program must meet regulatory requirements to replace defective meters and ensure accuracy of the meter fleet is maintained within limits. To support billing and regulations, we issue new meters for new building construction, undertake reactive replacement of failed meters and manage a program of planned replacement of meters and upgrading of service connections that have reached the end of their useful life. Samples of meters are tested for accuracy to regularly revise the criteria to identify future replacements.
Water Network EIMC	This program involved upgrading and replacing electrical, instrumentation, monitoring and control systems at water pump stations, water reservoirs and bulk water valve farms. Equipment was upgraded to meet current safety standards and reliability requirements.
Googong WTP Clarifier Renewals	This project renewed the clarifiers and their associated sludge pumping system at Googong WTP. These items had not been upgraded or replaced since the plant began operations in 1979. The project reconfigured the clarifiers to use contemporary equipment, and improved sludge withdrawal from the clarifiers. These renewals have improved the operability and reliability of the clarification process and Googong WTP.
Mugga Reservoir Roof Replacement and O'Connor Reservoir Roof Replacement	The Mugga reservoir roof replacement project was completed in 2020. The reservoir, with a capacity of 45.5 megalitre (ML), was built in 1966 as a balancing reservoir. The project included the replacement of the roof structure and columns, as well as the renewal of floor joints. Both elements had suffered significant degradation over the reservoir's lifetime. The O'Connor reservoir roof replacement project is expected to be completed in 2023. The roof structure is currently being replaced, and the floor joints are being renewed. Similarly to Mugga Reservoir, both components had significantly deteriorated. The O'Connor reservoir, with a capacity of 27.3 ML, was built in 1958 to supply the North Canberra pressure zone. Once completed, these reservoirs will continue to supply reliable drinking water to the Canberra water supply network.

Project / program	Project overview and benefits
Water Main Renewals (Structural Failures)	The aging water reticulation network requires ongoing renewal to continue to meet standards of service reliability. The cohort of cement-lined water mains installed between 1965 and 1978 are particularly susceptible to failure and has been the focus of renewals in addition to monitoring other areas of repeat failures. During the period, 7 kilometres (km) of water mains were replaced to address structural failures (with an additional 20km replaced to address hydraulic failures). See also, Water Mains Renewals (Hydraulic Failures) in Table 7-16.

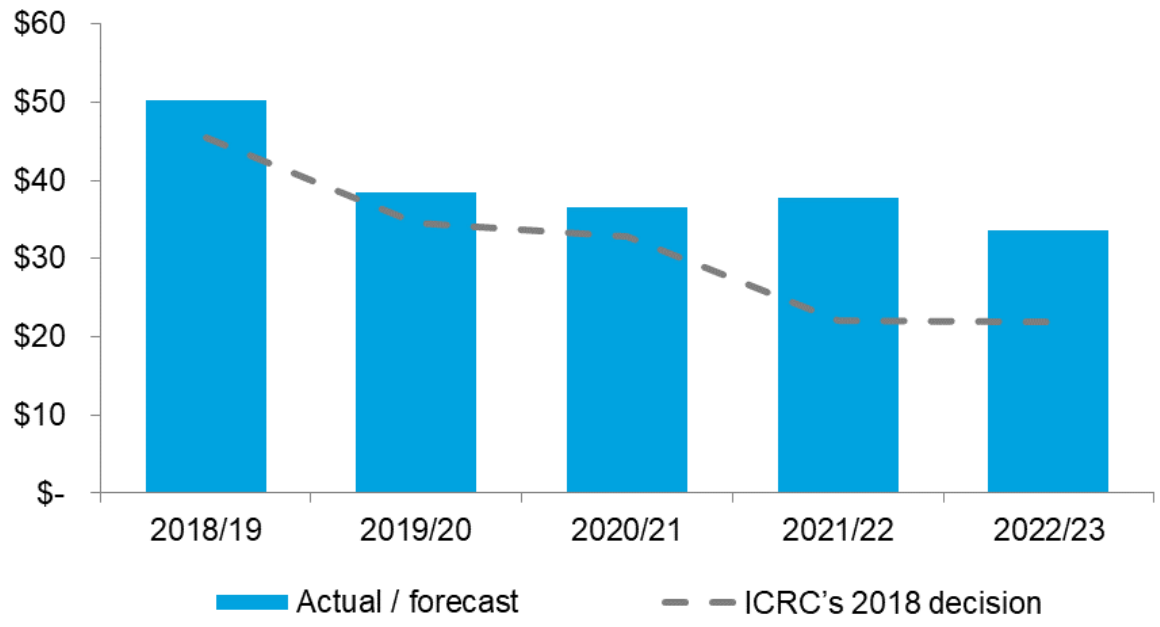
Source: Icon Water.

Wastewater

Over the 2018–23 regulatory period, Icon Water will invest $196.7 million to renew wastewater assets to maintain wastewater services. These renewals mean that our assets continue to operate at required health, environment and community standards. We have achieved this through the renewal and replacement of sewer mains, upgrades at LMWQCC and the renewal of sewer pumping stations.

Figure 7-7 shows Icon Water's expenditure on renewals for wastewater assets over the 2018–23 period.

Figure 7-7: Renewals capex – wastewater ($million, 2022–23)



Source: Icon Water.

Table 7-6 breaks down Icon Water's expenditure on renewals capex for wastewater assets by financial year against the Commission's 2018 decision.

Table 7-6: Renewals capex – wastewater ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Commission's 2018 decision	$45.4	$34.5	$32.8	$22.0	$22.0	$156.7
Actual / forecast	$50.3	$38.5	$36.5	$37.8	$33.6	$196.7
Variance	$4.9	$3.9	$3.7	$15.8	$11.7	$40.0

Source: Icon Water.
Note: Totals may not sum due to rounding.

The forecast capital expenditure is higher than the Commission's 2018 decision. Some project costs were higher than anticipated, including for the renewal of High Voltage Assets at LMWQCC. Minor changes to the scope of works required to rectify issues with existing asset conditions not foreseen in business case development also contributed to the variance. Some projects, including the Sewer Mains Renewal Program had their scope reduced during the regulatory period to minimise the overall variance of wastewater renewals capex.

Key wastewater renewals projects completed during the 2018–23 regulatory period are outlined in Table 7-7.

Table 7-7: Key wastewater renewal projects delivered over 2018–23

Project / program	Project overview and benefits
LMWQCC High Voltage Asset Renewal	The high-voltage electricity infrastructure at LMWQCC was over 40 years old and required upgrades to meet current safety and reliability standards, with low-voltage equipment intermingled with high-voltage equipment. This project is currently in construction and involves replacement of high voltage equipment (switchboards, etc.), supply and installation of a new back-up emergency generator, and installation of a ring-main to improve redundancy of supply on the site. Ensuring that LMWQCC has a safe, and reliable supply of power is critical to ensuring that Icon Water can continue to treat wastewater at the plant and protect the receiving environment. A prolonged power outage at LMWQCC would impact our ability to efficiently treat Canberra's sewage, as the biological processes would need to be re-established. The project is particularly important to ensure resilience to extreme weather events, with intense storms placing significant pressure on the electrical network.

Project / program	Project overview and benefits
Tertiary Filters	This project involved renewal of the tertiary treatment filtration system at LMWQCC. These assets had not had a major renewal since installation in the late 1970s. This work was completed while the plant was operational, and involved taking one filter of four offline at a time (25 per cent of the tertiary capacity) for extended periods during the two years that the work was underway. The practical difficulties of undertaking the works within an operating environment required innovative engineering solutions to provide safe access. The scope included replacement of the filter floors and air distribution pipework, which eliminated the need for maintenance in a confined space. Renewal with modern filter nozzle technology and a fit-for-purpose dissolved air flotation system improved the operation of the filters such that the previously de-rated hydraulic throughput has been restored to design capacity. Bypass flow controls have allowed 25 per cent of the clarified flow to be bypassed around the filters for disinfection prior to discharge, rather than going to the bypass storage dam and making the dam spill more frequently.
Sewer Mains Renewal	Replacement of aged sewer mains ensures Icon Water can meet regulatory and service delivery requirements and appropriately manage the risks associated with wastewater overflows, breaks and chokes. Mains are replaced after condition assessment which is carried out using closed-circuit (CCTV) cameras. Renewal works are targeted to areas with a known history of repeat failures.
Sewage Pump Station Renewals	This involved replacing and upgrading major elements at seven of the 27 pump stations in Icon Water's wastewater network. This included replacing pumps, pipework, valves and electrical switchboards, and improving ventilation at some sites. In addition, we improved the safety, access (including work at heights) and operation of the pump stations and enabled easier connection to back-up power supplies. This work ensures we can continue to transfer wastewater with minimal impact to the environment.
LMWQCC Aeration Blower Replacement	The aeration blower renewal project was initiated to replace the existing blowers at LMWQCC which were 38 years old and at the end of their anticipated service life. Failure of the blowers would result in a sustained impact on the treatment process and a lengthy breach of our discharge licence. The blowers had a history of motor failure and component breakdowns. Three older blowers were replaced with six new ones which have been automated and configured to operate more efficiently. This has improved the overall energy efficiency of the blowers whilst reducing noise on site, and improving personnel safety by removing the designation for hearing protection within this area. The new blowers automatically restart after a power dip or failure – this improved reliability has reduced our maintenance costs and made the maintenance that does need to occur more predictable to forecast.

Source: Icon Water.

Growth

Icon Water has delivered growth capex to respond to population growth and development which are forecast using projections of population growth by district as well as the ACT Government's four-year forward Indicative Land Release Program.[3]

Icon Water aims to provide water and wastewater services early to support growth but maintain enough flexibility in the program to respond to demand. Icon Water's investment decisions for growth capex are prudent and respond to feedback through consultation with the public and private developers.

Growth capex over the period has been driven by actual population growth and land release outcomes, which have shifted towards market-driven releases. This has resulted in some growth projects being prudently deferred, while others have been brought forward and prioritised within this period.

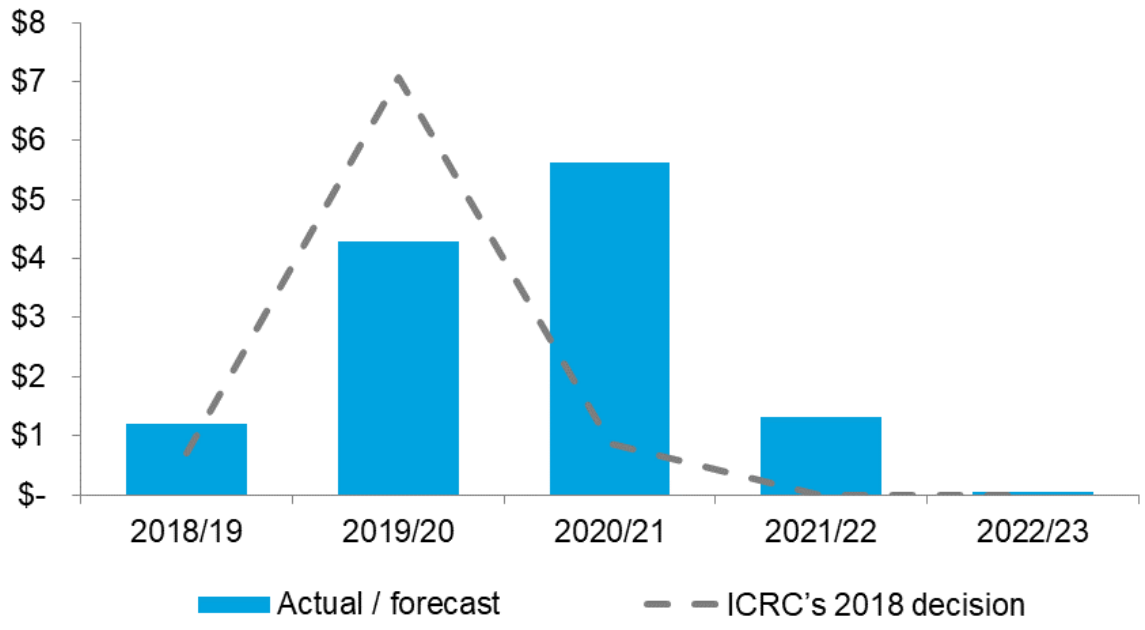
The Capital Contributions Code outlines arrangements for developers to pay contributions to fund water and wastewater infrastructure upgrades where higher demand increases the need for new assets. Under the Capital Contributions Code, the cost of infrastructure upgrades in established areas is shared between developers and Icon Water. Icon Water's total expenditure on growth assets therefore includes contributions paid by developers.

Water

Over the 2018–23 period, Icon Water will have delivered $12.5 million of new water services infrastructure to service growth within greenfield and infill developments, as well as to complete remaining works required on major water security projects commenced in the previous regulatory period.

Figure 7-8 shows Icon Water's expenditure on growth capex for water assets over the 2018–23 period.

Figure 7-8: Growth capex – water ($million, 2022–23)



Source: Icon Water.

[3] ACT *Government, Indicative Land Release Program 2021–22 to 2025–26*, 2021.

Table 7-8 breaks down Icon Water's expenditure on growth capex for water assets by financial year against the Commission's 2018 decision.

Table 7-8: Growth capex – water ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Commission's 2018 decision	$0.7	$7.1	$0.9	$0.0	$0.0	$8.6
Actual / forecast	$1.2	$4.3	$5.6	$1.3	$0.0	$12.5
Variance	$0.5	-$2.8	$4.8	$1.3	$0.0	$3.8

Source: Icon Water.
Note: Totals may not sum due to rounding.

The higher than forecast capital expenditure is driven by a variance in the cost of the One Tree Hill Reservoir due to fractured rock discovered during the excavation that required stabilisation. Most growth capex for water assets in the 2018–23 period was spent on this one project.

Key water growth projects completed during the 2018–23 regulatory period is outlined in Table 7-9.

Table 7-9: Key water growth projects delivered over 2018–23

Project / program	Project overview and benefits
One Tree Hill Reservoir	This involved construction of a dual tank reservoir, and upgrade of a pump station. The project enabled the 'Super High Zone' of the new suburb of Taylor to be serviced, and therefore released for development. This development preceded the introduction of the Capital Contributions Code, and therefore the infrastructure was funded through water tariffs. In future, this type of infrastructure will be funded by the developer but delivered by Icon Water.

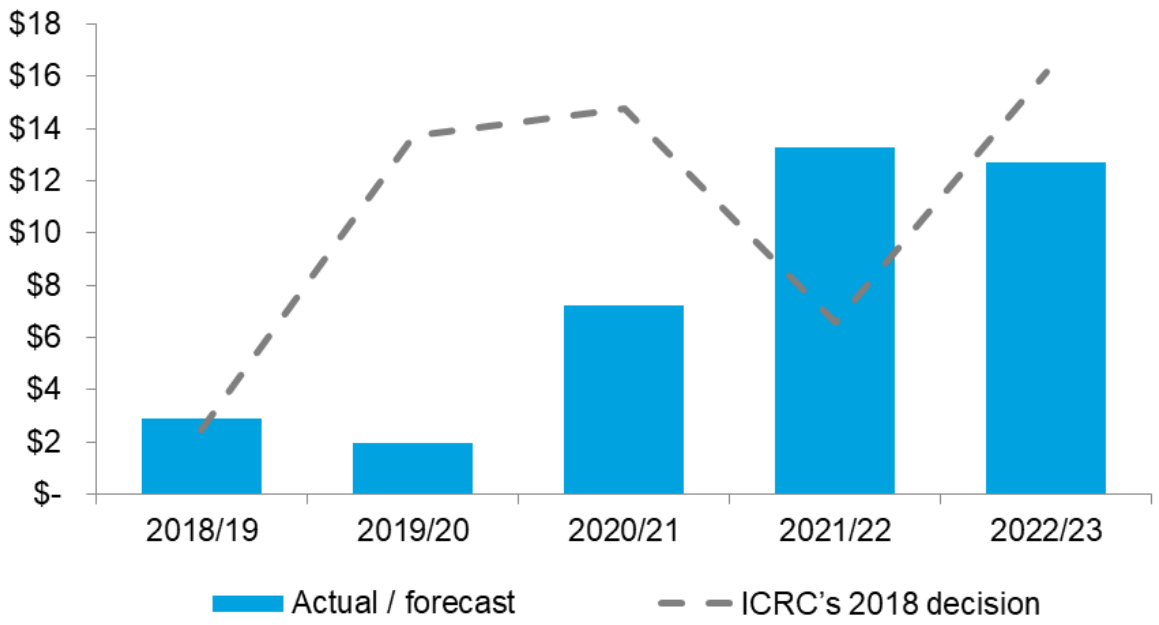
Source: Icon Water.

Wastewater

Over the 2018–23 period, Icon Water will have delivered $38.0 million of new wastewater infrastructure assets to ensure the region's growth requirements are met with wastewater services that adhere to health, environmental and community standards.

Figure 7-9 shows Icon Water's expenditure on growth capex for wastewater assets over the 2018–23 period.

Figure 7-9: Growth capex – wastewater ($million, 2022–23)



Source: Icon Water

Table 7-10 breaks down Icon Water's expenditure on growth capex for wastewater assets by financial year against the Commission's 2018 decision.

Table 7-10: Growth capex – wastewater ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
ICRC's 2018 decision	$2.5	$13.7	$14.7	$6.6	$16.2	$53.6
Actual / forecast	$2.9	$1.9	$7.2	$13.3	$12.7	$38.0
Variance	$0.4	-$11.8	-$7.5	$6.7	-$3.4	-$15.6

Source: Icon Water.
Note: Totals may not sum due to rounding.

The lower than forecast capital expenditure is mainly driven by decisions to delay augmentation works at the Fyshwick Sewage Treatment Plant and on the North Canberra Sewer system as they have not been triggered by development which was anticipated at the start of the regulatory period. Other projects, including the Belconnen Trunk Sewer Augmentation project, had a higher than anticipated cost.

Key wastewater growth projects completed during the 2018–23 regulatory period are outlined in Table 7-11.

Table 7-11: Key wastewater growth projects delivered over 2018–23

Project / program	Project overview and benefits
Belconnen Trunk Sewer Augmentation	Belconnen's trunk sewer system is being augmented through construction of a 2.4km duplication along Ginninderra Creek, and construction of additional odour control and ventilation units. The sewer construction supports additional growth in the Belconnen and Gungahlin regions in line with ACT Government planning strategies. The project will protect the environment from wet weather overflows in line with Icon Water's requirements under the ACT EPA approved *Canberra Sewer Network Environmental Plan, 2021* along with Icon Water's own technical standards. The additional odour control and ventilation units will prevent nuisance odours to residents in line with ACT EPA guidelines as well as minimise corrosion in Icon Water's trunk sewerage network.
North Weston Odour Control Facility	A forced ventilation system was installed near Ryan's Hill (located between the suburb of Coombs and the National Arboretum). The odour control facility will allow the major trunk sewers at this location to be mechanically ventilated to increase asset life and remove odour. This was part of a wider improvement to ventilation across the central and south Canberra area. The development of the Molonglo region, and subsequent encroachment on infrastructure, triggered this work to reduce the likelihood of odour complaints while also providing ventilation to minimise corrosion of the sewers. The project design was informed by dispersion modelling and delivered a vent stack with forced ventilation and the provision for an odour scrubber to be installed when and if required. Commissioning trials have concluded that the addition of an odour scrubber would be a prudent investment in further controlling odour complaints given the likely changes to sewage composition in the area and a project has been initiated to be delivered in the 2023–28 regulatory period. The need for this work was identified and approved in 2009. If similar work was identified today, it could be partially funded through developer contributions.

Source: Icon Water.

Efficiency

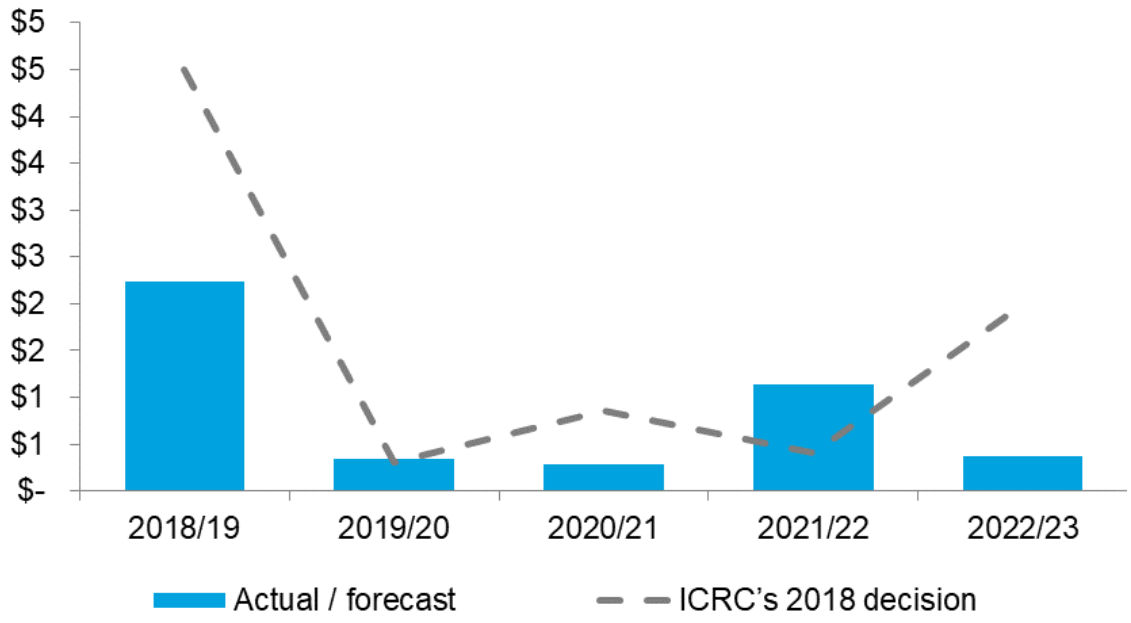
Icon Water's efficiency capex projects are works that will reduce costs or improve the performance of an existing infrastructure asset. While this section includes projects identified with efficiency as the main driver, projects with other primary drivers also lead to efficiency outcomes.

Water

Over the 2018–23 regulatory period, Icon Water will have invested $4.4 million to deliver new water services infrastructure to improve efficiency.

Figure 7-10 shows Icon Water's expenditure on efficiency capex for water assets over the 2018–23 regulatory period.

Figure 7-10: Efficiency capex – water ($million, 2022–23)



Source: Icon Water.

Figure 7-11 breaks down Icon Water's expenditure on efficiency capex for water assets by financial year against the Commission's 2018 decision.

Table 7-12: Efficiency capex – water ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Commission's 2018 decision	$4.5	$0.3	$0.9	$0.4	$2.0	$8.1
Actual / forecast	$2.2	$0.3	$0.3	$1.1	$0.4	$4.4
Variance	-$2.3	$0.0	-$0.6	$0.7	-$1.6	-$3.7

Source: Icon Water.
Note: Totals may not sum due to rounding.

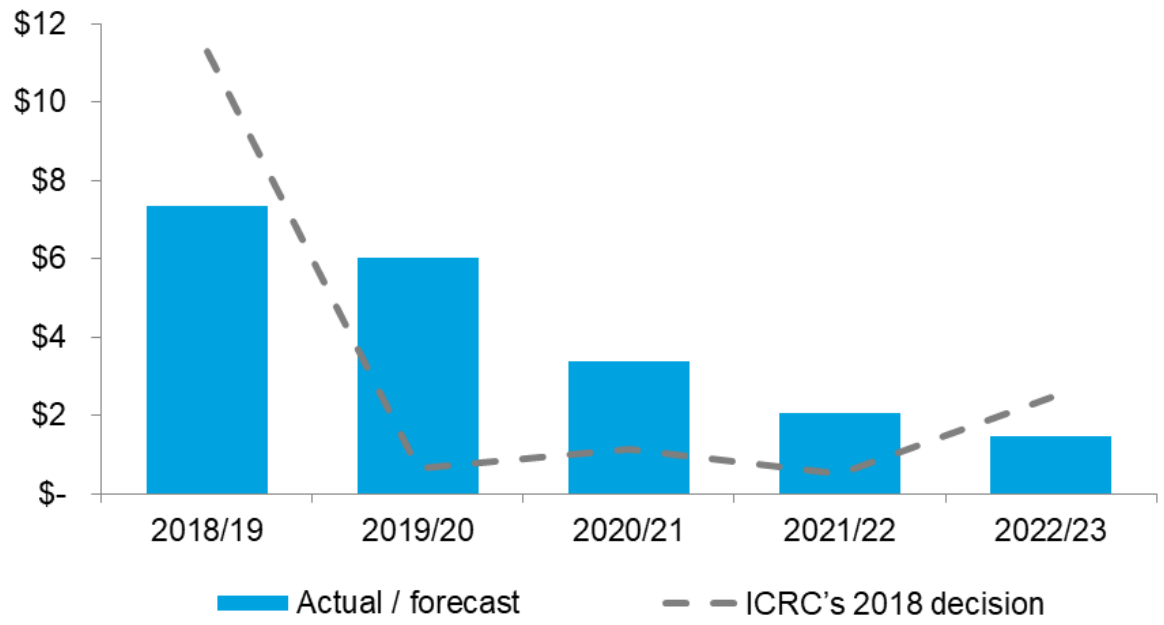
The lower than forecast capital expenditure is mainly driven by a decrease in the scope or deferral of projects delivered under Icon Water's renewable energy program.

Wastewater

Over the 2018–23 regulatory period, Icon Water will have invested $20.3 million to deliver new wastewater services infrastructure to improve efficiency.

Figure 7-11 shows Icon Water's expenditure on efficiency capex for wastewater assets over the 2018–23 regulatory period.

Figure 7-11: Efficiency capex – wastewater ($million, 2022–23)



Source: Icon Water

Table 7-13 breaks down Icon Water's expenditure on efficiency capex for wastewater assets by financial year against the Commission's 2018 decision.

Table 7-13: Efficiency capex – wastewater ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Commission's 2018 decision	$11.3	$0.7	$1.1	$0.5	$2.4	$16.1
Actual / forecast	$7.3	$6.0	$3.4	$2.1	$1.5	$20.3
Variance	-$4.0	$5.4	$2.2	$1.6	-$1.0	$4.2

Source: Icon Water.
Note: Totals may not sum due to rounding.

The higher than forecast capital expenditure is primarily driven by expenditure to deliver upgrades to screens and ventilation at LMWQCC as part of the solids handling works upgrades.

Key wastewater efficiency projects completed during the 2018–23 regulatory period are outlined in Table 7-14.

Table 7-14: Key wastewater efficiency projects delivered over 2018–23

Project / program	Project overview and benefits
Solar Photovoltaic Program	1.4 megawatt (MW) of solar photovoltaic (PV) panels were installed at various sites. The largest installation was at LMWQCC treatment plant with another significant array installed on the administrative office building in Mitchell. The generation of electricity and feed back into the grid enables us to offset a significant proportion of the energy used at the treatment plant, and reduces Icon Water's exposure to volatility in electricity pricing.
LMWQCC Solid Handlings – Screens, Grit and Ventilation Upgrade	This project saw the installation of inlet screens, screenings handling and grit systems to improve the performance and increase the capacity and reliability of the solids handling system. The improvements made by this project will deliver a more reliable and consistent feed to the furnaces, improving the efficiency of operation.

Source: Icon Water

Regulation

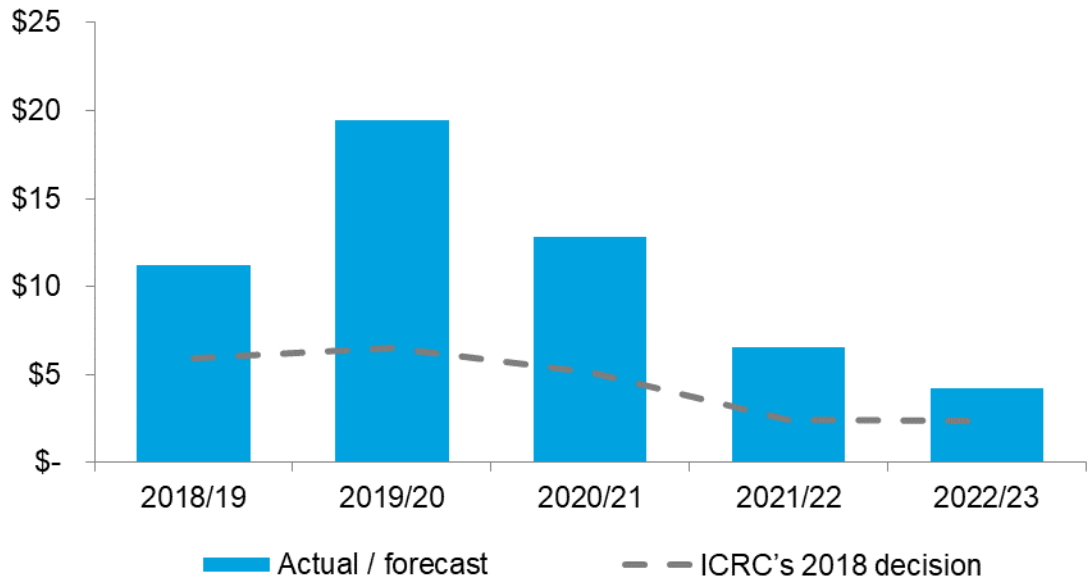
Regulation capex includes projects identified through Icon Water's monitoring of new legislation and standards; condition reports from system operators; network planning and risk assessment reviews; and close monitoring of asset performance in relation to existing standards, legislation, licence conditions and codes. The timing of the regulation driven projects is based on cost effectiveness and compliance with the different regulatory obligations.

Water

Over the 2018–23 period, Icon Water will have invested $54.3 million to deliver new water services infrastructure to comply with regulatory obligations.

Figure 7-12 shows Icon Water's expenditure on water assets to meet regulatory obligations over the 2018–23 period.

Figure 7-12: Regulation capex – water ($million, 2022–23)



Source: Icon Water

Table 7-15 breaks down Icon Water's expenditure on regulation capex for water assets by financial year against the Commission's 2018 decision.

Table 7-15: Regulation capex – water ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Commission's 2018 decision	$5.9	$6.5	$5.1	$2.4	$2.3	$22.3
Actual / forecast	$11.2	$19.5	$12.8	$6.5	$4.2	$54.3
Variance	$5.3	$13.0	$7.7	$4.1	$1.9	$32.1

Source: Icon Water.
Note: Totals may not sum due to rounding.

The higher than forecast capital expenditure is mainly driven by increases to the scope of works to renew water mains to meet flow and pressure requirements.

Key water regulation projects completed during the 2018–23 regulatory period are outlined in Table 7-16.

Table 7-16: Key water regulation projects delivered over 2018–23

Project / program	Project overview and benefits
Water Mains Renewals (Hydraulic Failures)	Replacing aged water mains (the oldest dating back to 1915) ensures Icon Water can meet fire flow requirements and improves the quality of water being supplied by previously unlined cast iron mains. The majority of the program was targeted to unlined cast iron water mains to ensure that they could continue to meet fire flow standards after development, standard changes and asset deterioration since they were installed. During the period, 20km of water mains were replaced to address 'hydraulic failures' (with an additional 7km replaced to address 'structural failures'). See also, Water Main Renewals (Structural Failures) in Table 7-5.

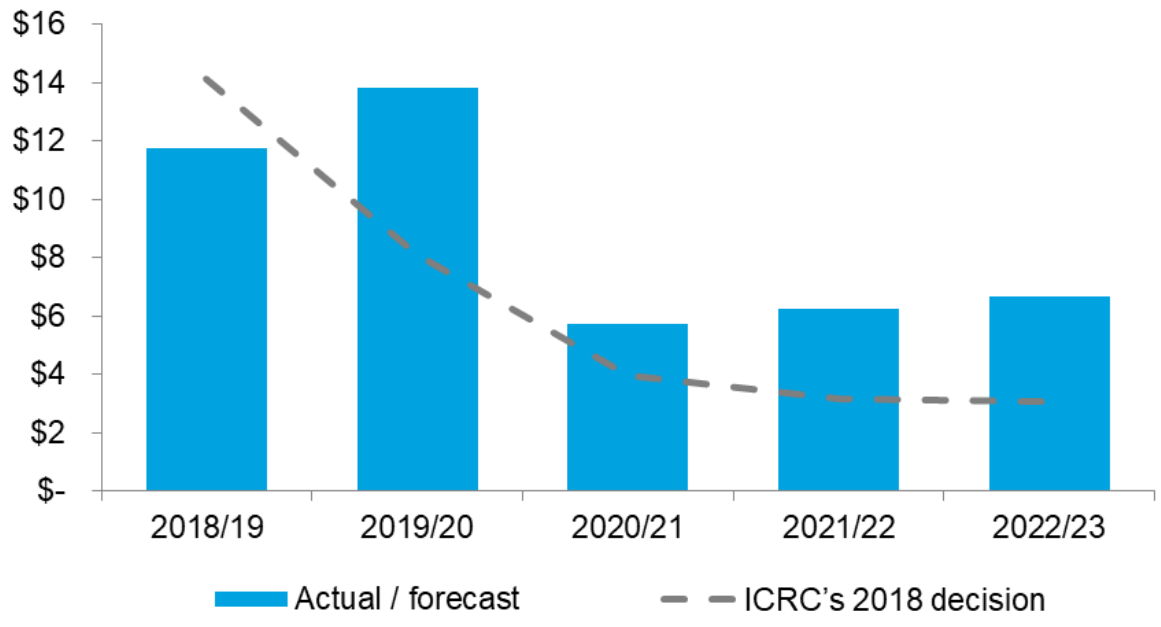
Source: Icon Water.

Wastewater

Over the 2018–23 regulatory period, Icon Water will have invested $44.2 million to deliver new wastewater services infrastructure to comply with regulatory obligations.

Figure 7-13 shows Icon Water's expenditure on wastewater assets to meet regulatory obligations over the 2018–23 regulatory period.

Figure 7-13: Regulation capex – wastewater ($million, 2022–23)



Source: Icon Water.

Table 7-17 breaks down Icon Water's expenditure on efficiency capex for wastewater assets by financial year against the Commission's 2018 decision.

Table 7-17: Regulation capex – wastewater ($million, 2022–23)

	2018–19	2019–20	2020–21	2021–22	2022–23	Total
Commission's 2018 decision	$14.1	$8.1	$3.9	$3.2	$3.0	$32.4
Actual / forecast	$11.7	$13.8	$5.7	$6.3	$6.6	$44.2
Variance	-$2.4	$5.7	$1.8	$3.1	$3.6	$11.8

Source: Icon Water.
Note: Totals may not sum due to rounding.

The higher than forecast capital expenditure is mainly driven by projects at LMWQCC, including installation of a sludge holding tank, replacement of the centrifuges and upgrades to the furnace and exhaust system.

Key wastewater regulation projects completed during the 2018–23 regulatory period are outlined in Table 7-18.

Table 7-18: Key wastewater regulation projects delivered over 2018–23

Project / program	Project overview and benefits
LMWQCC – Solids Handling (Furnace & Exhaust Upgrade, Centrifuge Replacement, Sludge Holding Tank Upgrade)	These projects are regulation driven upgrades to solids handling facilities at LMWQCC, including the sludge holding tank, screens, grit handling, ventilation, and furnace and exhaust system. These upgrades ensure Icon Water can meet environmental regulatory requirements and reduce Environmental Authorisation breaches.[4] These upgrades will also support handling of forecast growth in load to be treated at the facility.
Network Access Upgrades	This project has involved replacement and reconfiguration of ladders, davit bases etc., to improve personnel safety and meet legislation around working at height.[5] This enables safer and faster access to Icon Water infrastructure by our staff. This improves response time to network issues and allows easier preventative maintenance activities.

Source: Icon Water.

Non-system assets

Non-system assets include ICT, buildings, vehicles, and other investment which is not directly part of the water or wastewater network. Icon Water's investment in non-system assets during the 2018–23 regulatory period was $79.4 million, which is allocated between water and wastewater services. The Commission's allowance for the 2018–23 regulatory period for non-system assets was $66.1 million.

Key non-system asset projects completed during the 2018–23 regulatory period are outlined in Table 7-19.

[4] Legislative requirements include the *Environmental Protection Act and licence conditions (Environmental Authorisation 0009)*

[5] Legislative requirements include the *Work Health and Safety Regulation 2011 (ACT), Part 3.1.*

Table 7-19: Key non-system projects delivered over 2018–23

Project / program	Project overview and benefits
Asset Management and Maintenance Solution	In 2019, Icon Water completed a significant multi-year works and asset management system project to replace one of our core systems. A major undertaking, the project has led to asset related information improvements and given us valuable insight into the performance of our works and asset management activities. We have also seen improvements in our maintenance regimes, scheduling and allocation of work orders, and we have optimised the use of maintenance crews and their ability to respond to both reactive maintenance issues and planned maintenance works.
Dependencies for the managed services transition (related to CSA/CSCSA transition)	To facilitate the CSA/CSCSA transition, Icon Water has identified several legacy and end-of-life capabilities as dependencies to be completed during the current regulatory period. Legacy capabilities must be migrated or modernised in the lead-up to the CSA/CSCSA transition and retired off ActewAGL infrastructure. For example, legacy networks will be upgraded, and a number of capabilities such as a water meter management system, enterprise data platform and website will form the basis for further enhancement in the next regulatory period.
Critical Infrastructure Stage 2 Program	This risk-based security upgrade program has reduced the risks of unauthorised access, terrorism and vandalism incidences at Icon Water's sites. The enhanced security delivered under this project will protect Icon Water's critical assets and minimise risks to those assets as well as staff, contractors, visitors and the general public.

Source: Icon Water.

7.3 Forecast capex 2023–28

7.3.1 Overview

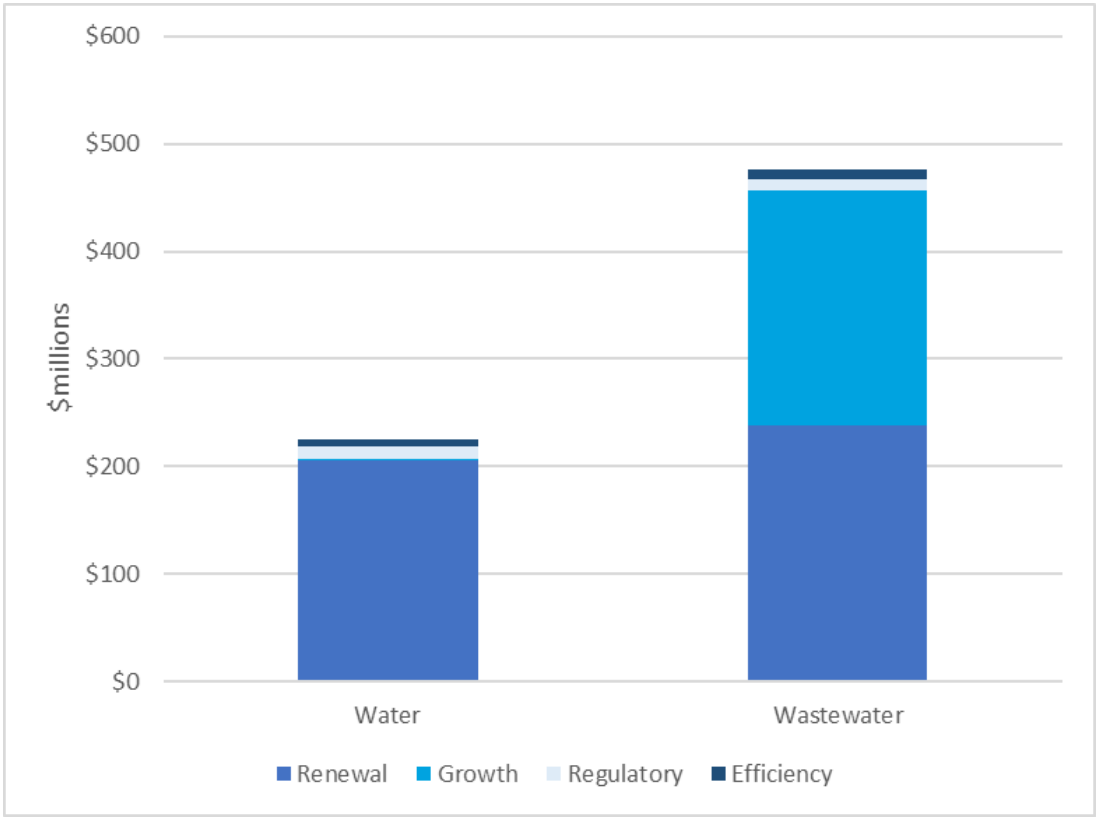
Icon Water's expenditure forecast for its planned capital program over the 2023–28 regulatory period is $702.0 million ($2022–23) including $225.8 million for investment in water services assets and $476.3 million for investment in wastewater services assets. This includes $95.6 million investment in non-system assets which is allocated between water and wastewater services.

This program includes wastewater projects that will be co-funded by capital contributions from developers. Expenditure funded by developer co-contributions for the 2023–28 regulatory period is forecast to be $30.4 million. Icon Water's forecast capex net of these capital contributions is $671.7 million ($2022–23).

Our 2023–28 price proposal adopts a lower-bound estimate of forecast expenditure for the Biosolids Management Renewal and Secondary Treatment Bioreactors Capacity Upgrade projects at LMWQCC. Both projects are critical and the majority of the works in the 2023–28 regulatory period are expected to occur in 2026–27 and 2027–28. Actual expenditure for the projects may vary depending on the preferred options and we intend to include actual expenditure for ex-post review in our next regulatory proposal. Icon Water's decision to include the lower-bound estimate of forecast expenditure for the two projects minimises the short-term impact on customers' wastewater bills.

Figure 7-14 shows forecast capex over the 2023–28 regulatory period by driver and split into water and wastewater expenditure.

Figure 7-14: Forecast capex 2023–28 by driver ($million, 2022–23)



Source: Icon Water.

The proposed capex program will enable Icon Water to renew ageing critical systems and non-system infrastructure to maintain service levels for customers. Approximately 60 per cent of the forecast capex

is for the renewal of existing assets. The next largest category of forecast capex is for growth assets, particularly for wastewater services.

Table 7-20 shows a summary of forecast capex over the 2023–28 regulatory period.

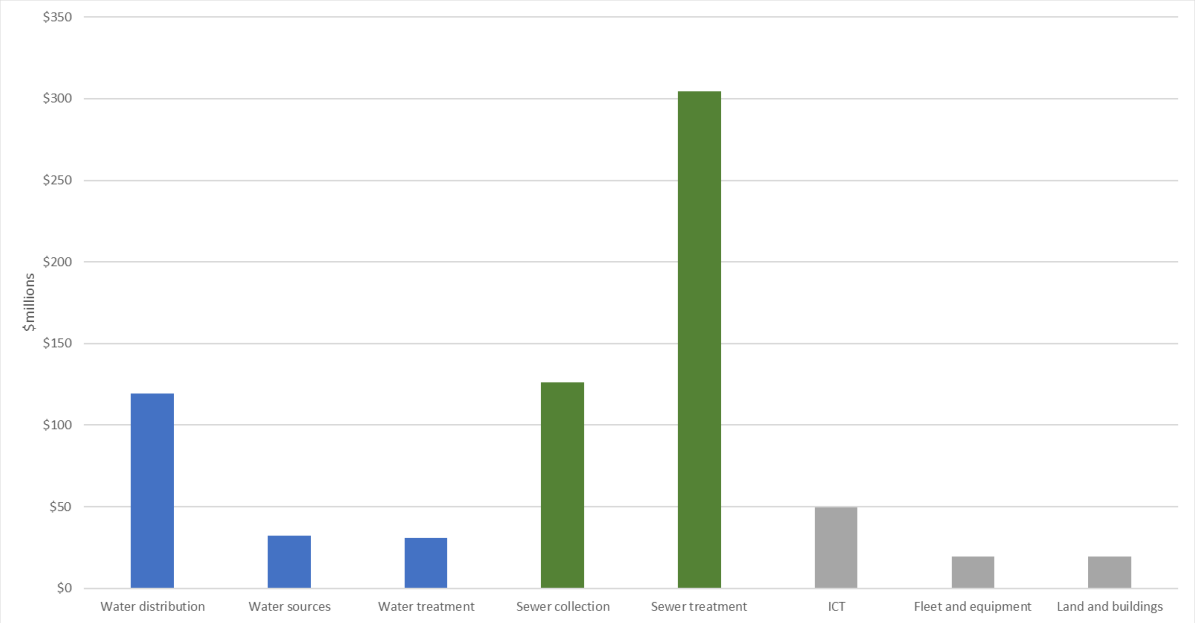
Table 7-20: Summary of forecast capex, 2023–28 ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Water						
Renewal	$66.5	$48.3	$39.1	$23.8	$28.7	$206.3
Growth	$0.0	$0.0	$0.0	$0.0	$0.3	$0.3
Efficiency	$6.3	$2.4	$3.0	$0.0	$0.0	$11.7
Regulatory	$0.9	$0.5	$1.6	$4.4	$0.0	$7.4
Total capex water	**$73.7**	**$51.2**	**$43.7**	**$28.1**	**$29.0**	**$225.8**
Wastewater						
Renewal	$53.2	$45.2	$55.6	$42.0	$42.8	$238.9
Growth	$19.8	$23.2	$31.4	$66.6	$76.2	$217.1
Efficiency	$4.5	$3.0	$2.2	$1.7	$0.0	$11.4
Regulatory	$0.9	$0.8	$2.3	$4.8	$0.1	$8.8
Total gross wastewater capex	**$78.3**	**$72.2**	**$91.5**	**$115.1**	**$119.1**	**$476.3**
Less capital contributions	*$3.0*	*$13.7*	*$4.3*	*$4.0*	*$5.3*	*$30.4*
Total net capex, wastewater	**$75.4**	**$58.5**	**$87.2**	**$111.1**	**$113.8**	**$445.9**
Total gross capex	**$152.1**	**$123.4**	**$135.2**	**$143.3**	**$148.1**	**$702.0**
Total net capex	**$149.1**	**$109.7**	**$130.8**	**$139.2**	**$142.8**	**$671.7**

Source: Icon Water.
Note: Totals may not sum due to rounding.

The total forecast capex program for the 2023–28 regulatory period by asset category is shown in Figure 7-15.

Figure 7-15: Forecast capex 2023–28 by driver ($million, 2022–23)



Source: Icon Water.

Box 7-5: 2023–28 program delivery approach

- The majority of the projects and expenditure in the planned program are similar in scale and delivery complexity to typical projects undertaken by Icon Water in a five-year period. Consequently, delivery planning assumes a continuation of our standard approach with delivery managed through Icon Water project managers and supported by design consultants and principal contractors via competitive procurement.
- The two major LMWQCC projects (See Box 7-2 and 7-3) are significantly larger in expenditure scale and delivery complexity than the remainder of the program. Icon Water will be pursuing tailored delivery approaches for these projects to provide the required delivery capacity and capability. Delivery planning for these projects is occurring in parallel with the options assessment. This delivery planning work will allow the business cases to be developed based on delivering the recommended option in an efficient, and effective way. The consideration for this includes assessing the benefits of adopting a common approach for both projects as well as for other projects and works across the organisation. As these two projects have additional technical dependencies to the wastewater strategy, additional governance arrangements are in place for these as described in **Attachment 5: Asset management governance**.
- The overall program also includes a portion of expenditure which will support growth capital works. As part of the Capital Contributions Code, Icon Water may choose to have the delivery of these projects managed and delivered in conjunction with the developer to improve efficiencies in overall delivery. Alternatively, Icon Water may choose to deliver class 2 out-of-precinct infrastructure which is fully funded by the developer. These assessments will be made on a case-by-case bas using principles outlined in an assessment framework.
- For the digital program, the interdependencies between projects create complexities for the management of project portfolios. Icon Water is vigilant in making sure project dependencies are clearly specified and factored into its digital program. We use a combination of internal resources and contracted staff to manage and deploy technology programs to manage resource workloads and avoid change fatigue within the organisation.

7.3.2 Forecasting method

Figure 7-16 illustrates the forecasting methodology used to prepare Icon Water's capex forecast for the 2023–28 regulatory period, with details on each of these steps provided in the following section. Detailed explanation of Icon Water's project identification, prioritisation and governance process are provided in **Attachment 5: Asset Management governance**.

Figure 7-16: Forecasting methodology steps for capex

Source: Icon Water.

Project based evaluation

Icon Water adopted a bottom-up approach to forecasting capex. This employs our investment planning and development (IPaD) process as detailed in **Attachment 5: Asset management governance**.

This approach means our capex program is consistently evolving as each stage of a project's approval is subjected to prudency and efficiency testing. For the development of our capex forecast for the 2023–28 regulatory period, we undertook a detailed review of the program, which involved identifying costing, reviewing and prioritising ongoing and future capital requirements at a detailed project level, then applying escalation factors to calculate total forecast costs at a moment in time.

Project need identification

We have ongoing identification of current or potential gap in services. This uses a risk-based approach and assesses whether the ability of the infrastructure to meet service levels or other obligations is, or may be, compromised. This process considers potential impacts on service levels which may occur and, where appropriate, the value to customers of addressing the service gap.

These gaps are included in our asset management plans, which then outlines the changes required over the next 20 years to continue to meet the service level. Where possible and cost effective to do so, we attempt to close these gaps through alterations or improvements to operational procedures and practices. This process is explained further in section 5.3.2 of **Attachment 5: Asset management governance.**

Capital projects for the 2023–28 regulatory period were identified based on ongoing and future capital requirements. Ongoing capital requirements included renewal or replacement of existing assets and are identified according to asset condition and risk assessments, obligation assessments and service performance requirements. Future capital requirements include the expansion of the existing network arising from growth in the region and future regulatory obligations, as well as opportunities to work more efficiently.

Project base forecast

Once the need for a capital project has been established, we undertake several steps to forecast base capital costs at a project level.

For candidate projects, where option selection and planning is several years away we develop an *initial forecast* based on a typical industry solution. This may be either parametric where it is work that is commonly undertaken by Icon Water, or developed by external cost estimators where the activity is less frequently undertaken by Icon Water.

All projects above $250,000 require a concept development statement (CDS).These outline the requirements, assumptions and capex forecast as well as costs and timing to complete the options assessment. The timing for the development of the CDS is recommended by the portfolio planning team based on the lead time for delivery and options assessment, and considering the scale and priority of the project in line with the overall investment portfolio. A business case is then prepared for all capex projects that have had CDSs approved by our Investment Review Committee (IRC). Each business case includes an option analysis, financial analysis (including detailed cost forecasts) and preferred solution to the identified requirement.

Once a business case is endorsed a development stage proposal (DSP) is then prepared which outlines the design and delivery planning works for the capital project including procurement activities for the project as required.

Review project forecasts

Throughout the development of a capital project the project forecast is reviewed and then endorsed at each of the stage gates of the IPaD process.

This process of reviewing project forecasts is supported by using external consultants with expertise and industry knowledge to review projects and provide advice on deliverability, options analysis, costs and schedule.

In addition, when projects are at an early phase, independent third-party consultants are engaged to provide high level estimates based on typical industry solutions to identified projects. This ensures investment required for our asset classes are verified and are examined for completeness. We then carry out reviews of our investments across asset class, location and investment driver to verify information coming out of and going into our asset management plans.

Prioritise projects

After forecasting base costs for each project, we undertook a project prioritisation process. This process involved providing an impact score for each project against the six defined business drivers.[6] All projects' strategic value scores were then ranked. Those with lower risks (and lower priority scores) were reduced in scope or identified for prudent deferral and excluded from the capex program for the 2023–28 regulatory period. Strategic value for these projects will continue to be monitored over the next five years.

Program investment scenario modelling

Projects with a forecast spend of over $2.5 million per annum across all asset classes and expenditure types were analysed through Icon Water's portfolio assessment tool. These scenarios were assessed to determine the appropriate investment frontier that balances cost, risk and performance against Icon Water's entire asset portfolio.

Evaluate program deliverability

Once individual projects were given a strategic value score and deemed to be included or excluded from the capex program, Icon Water evaluated the deliverability of the program with regards to any system constraints and capacity requirements (for example, if two assets cannot be offline at the same time), staging of projects, and smoothing of cashflow. Where necessary, project timing was revised to ensure efficient delivery of the program and reduce risk to the reliability or quality of services.

Escalation factors

The final step to finalise our capex forecast for the 2023–28 regulatory period was to apply escalation assumptions to project base cost forecasts. We engaged independent consultants, BIS Oxford Economics to assist in developing appropriate ACT-specific escalation factors for engineering construction costs and labour cost escalators that were applied to ICT projects, provided in Table 7-21.

Table 7-21: Real implicit price inflator for engineering capex for the ACT (%)

	2023–24	2024–25	2025–26	2026–27	2027–28	Average
Price inflator for engineering construction costs	0.2%	0.6%	0.6%	0.3%	0.0%	0.3%
Price inflator for ICT capex	1.0%	1.3%	1.3%	0.6%	0.6%	1.0%

Source: Icon Water.
Note: numbers have been rounded to one decimal place.

Icon Water has applied the price inflator for engineering construction costs to all non-ICT capex projects. For ICT projects, Icon Water has applied the electricity, gas, water and wastewater services wage price

[6] Additional information on business drivers is provided in **Attachment 5: Asset management governance**.

indices for the ACT, estimated by BIS Oxford Economics. BIS Oxford Economics' methodology and assumptions are detailed in its report (see **Appendix 6.2**).

We intend to update the escalators following the Commission's draft decision to provide as recent a forecast as possible in the revised proposal ahead of the Commission's final decision in 2023.

Assumptions and project estimates accuracy

The assumptions on which cost estimates are based are specific to each project identified and detailed in Icon Water's project documentation. Estimates were generally based on costs of previous, similar projects or advice from independent cost estimators and expert consultants. Where appropriate, quotations from suppliers were also obtained for some specialist equipment.

The accuracy of project estimates is dependent on how progressed the project is in the IPaD process. For pre- CDS the estimate accuracy is expected to be in the range of +/- 100 per cent. For projects already in construction, the estimate is expected to be within +/- 10 per cent.

7.3.3 Forecast capex by driver

Renewal capex

Asset renewal remains the primary driver of Icon Water's capex for the 2023–28 regulatory period, accounting for 63 per cent of the total capex program. The renewal program will include:

- $166.9 million for water assets
- $196.1 million for wastewater assets
- $80.3 million for non-system assets.

This expenditure ensures Icon Water can continue to safely and reliably deliver essential services to customers. The program is driven by asset condition and compliance requirements relating to safety, levels of service and asset protection. In planning our renewals program, we have also taken into account the specific feedback received from engagement with consumers regarding water and sewer mains renewal programs, as detailed in **Attachment 2: Customer and community engagement** and **Attachment 3: Service standards**.

Asset replacement is prioritised using a risk-based approach. Assets are generally renewed either as a result of equipment failure or deteriorating condition indicating increased risk of failure, rather than by direct reference to age. These replacements are assessed using sophisticated Failure Mode Effect Analysis (FMEA) principles. Replacements of critical assets are planned to avoid failure as this could impact levels of service for customers and result in Icon Water not meeting service standards and/or regulatory obligations.

Detailed asset renewal requirements are provided at an asset class level in Icon Water's asset management plans, as discussed in **Attachment 5: Asset management governance**.

Forecast renewal capex for the 2023–28 regulatory period is set out in Table 7-22.

Table 7-22: Forecast renewal capex ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Water						
Water network	$25.6	$29.7	$27.6	$14.3	$14.7	$112.0
Water sources	$25.3	$2.3	$1.2	$0.1	$2.2	$31.2
Water treatment	$5.6	$5.5	$3.1	$3.1	$6.3	$23.7
Total renewal capex – water	**$56.5**	**$37.6**	**$32.0**	**$17.6**	**$23.2**	**$166.9**
Wastewater						
Sewer network	$22.7	$19.5	$15.0	$16.5	$18.7	$92.5
Sewer treatment	$18.6	$16.8	$32.1	$18.2	$17.9	$103.6
Total renewal capex – wastewater	**$41.3**	**$36.4**	**$47.1**	**$34.7**	**$36.6**	**$196.1**
Non-system						
ICT	$2.7	$8.6	$11.9	$11.8	$6.5	$41.6
Fleet and equipment	$7.3	$3.9	$3.0	$0.9	$4.3	$19.5
Land and buildings	$12.0	$5.6	$0.6	$0.6	$0.6	$19.3
Total non-system capex, renewal	**$22.0**	**$18.2**	**$15.5**	**$13.3**	**$11.4**	**$80.3**
Total renewal capex	**$119.8**	**$92.2**	**$94.6**	**$65.6**	**$71.1**	**$443.3**

Source: Icon Water.
Note: Totals may not sum due to rounding.

Key renewal projects for the 2023–28 regulatory period are outlined in Table 7-23, Table 7-24 and Table 7-25.

Table 7-23: Key projects – renewal of water assets

Project / program	Project overview and benefits
Water Meter Renewals	Water meters are used to accurately measure and bill for customer water consumption and manage water loss in the water distribution system (water balance) which is essential to Icon Water's business. The water meter fleet which consists mostly of mechanical meters, wear with use and age. The program must meet regulatory requirements to replace defective meters and ensure accuracy of the meter fleet is maintained within limits. To support billing and regulations, we issue new meters for new building construction, undertake reactive replacement of failed meters and manage a program of planned replacement of meters and upgrading of service connections that have reached the end of their useful life. Samples of meters are tested for accuracy to regularly revise the criteria to identify future replacements.

Project / program	Project overview and benefits
Cotter Pump Station Upgrade	The Cotter Pump Station supplies raw water from either the Cotter Dam or the Murrumbidgee River to Stromlo WTP. Access to this water supply is reliant on the pump station. Since May 2018 reliability has varied and there have been multiple pump failures which have resulted in the station being unable to meet targeted abstraction rates from Cotter Dam. Redundancy within the bulk supply network allows these shortfalls to be supplemented with flows from Bendora Reservoir or Googong Water Treatment Plant. This is not sustainable in the medium term as Cotter Dam holds 27 per cent of Canberra's source water storage and this water needs to be sourced by reliable means. Further, maintenance at the station is difficult because of its heritage listing, poor access and outdated technologies. The old pumps to be decommissioned are also inefficient compared to modern pumps, requiring more energy to deliver the same quantity of water. The project involves the demolition of the Pump 10 building and construction of a new building, plus two new pumps, a high voltage switch room and supply and discharge manifolds. The new pump station will provide redundant pumping capacity and allow for decommissioning of the historic Cotter Pump Station (Cotter WPS No.1). This project is linked to our customer outcome of planning and preparing for the region's future water supply needs.
Water Main Renewals	Icon Water is required to manage the integrity of the water network to provide safe and reliable water services to our customers. We do this through a rolling reactive maintenance and renewal program. Predictive modelling is used to support a proactive renewal program that aims to sustain customer service levels and optimise variation in the levels of service between customers. This approach seeks to balance risk, cost and performance for the long-term management of water mains. We conducted specific qualitative and quantitative customer engagement on the reliability of water services, and the impact of various renewal approaches with the potential price impact. Our forecast capex for water mains renewals reflects a service level valued by our customers and will allow Icon Water to maintain reliable water services into the future.

Project / program	Project overview and benefits
Lower Red Hill Reservoir	Icon Water has 21 post tensioned, wire wound concrete reservoirs in service that were constructed between 1953 and 1977 and range between 4.5 to 27.3ML in size. Lower Red Hill Tank B is one of them; it was constructed in 1953–54 and has a nominal capacity of 9.3ML. The reservoir's condition has deteriorated substantially and currently presents the most concern, from a structural integrity perspective, of all of Icon Water's wire wound reservoirs. There have been multiple external condition assessments of the reservoir, and the reservoir has now been permanently removed from service to prevent failure. A replacement of the reservoir is the preferred approach due to the reservoir's deteriorating condition. A holistic evaluation of the optimum replacement for the zone is under assessment. This will include options such as feeding water to the zone from existing assets as an alternative to replacing the reservoir. Any replacement will need to provide for existing and projected demand in the zone and meet operating and emergency storage requirements.

Source: Icon Water.

Table 7-24: Key projects – renewal of wastewater assets

Project / program	Project overview and benefits
LMWQCC Biosolids Management Renewal	This project is a renewal driven upgrade of the biosolids treatment and management infrastructure at LMWQCC. The furnaces have been in operation since the 1970s and are nearing their end of nominal service life. Given the scale, complexity and criticality of the assets, and allowing adequate time for design and construction activities, investigations into replacement solutions have commenced to ensure continuity of service. The project was established to develop concept designs for feasible technology options to address objectives including: • energy and resource recovery potential for each option • community expectations • potential reuse products and market analysis • environmental and sustainability opportunities.
Sewer Mains Renewal	Replacing aged sewer mains ensures we can meet regulatory and service delivery requirements and appropriately manage the risks associated with sewer overflows, breaks and chokes. Mains are replaced after condition assessment via CCTV and are targeted to material and areas with a history of repeat failures. We conducted specific qualitative and quantitative customer engagement on the reliability of wastewater services, and the impact of various renewal and maintenance approaches with the potential price impact. Our forecast capex for sewer mains renewals reflects a service level valued by our customers and will allow Icon Water to maintain reliable wastewater services into the future.
LMWQCC EIM&C Renewal	Replacement of LMWQCC EIM&C assets will assist in ensuring reliable and safe operation of these asset types, contributing to achieving regulatory, service delivery and operational requirements for LMWQCC treatment processes. Assets require replacement for a range of reasons most commonly being the assets have met or exceeded their recommended service life with limited or no manufacturer support available; assets are in poor condition and/or are unreliable; assets no longer meet the required safety standards; or the functionality does not meet requirements (eg. process or operational).

Source: Icon Water.

Table 7-25: Key projects – renewal of non-system assets

Project / program	Project overview and benefits
Office Expansion Space Utilisation	Our lease at ActewAGL House Level 5 will end in December 2024. This project is in the early stages and will examine the feasible options for providing office accommodation for staff currently housed at ActewAGL House. Any options developed will need to consider relevant legislation, supporting land and building strategy objectives, minimum rates for water and energy efficiency as well as the ability to promote flexible and efficient work environments.

Source: Icon Water.

Growth capex

Icon Water's forecast for growth capex over the 2023–28 regulatory period is $217.6 million, or approximately 31 per cent of the capex program. The growth program will include:

- $0.3 million for water assets
- $217.3 million for wastewater assets
- no expenditure for non-system assets.

Growth projects create new assets or upgrade or improve existing assets beyond their original capacity or performance. This is in response to changes in usage, customer expectations, or anticipated future needs, to ensure Icon Water can provide safe and reliable services to the growing population of Canberra and its surrounds.

Planning for the growth of water supply and wastewater services is governed by the ACT Government's land use planning framework and population projections. This framework identifies the forward planning direction for the ACT, areas currently under the ACT Government's scope of planning and future investigation areas and develops long-term land release strategies. This framework has seen a shift from a centralised planning model (where a specific amount of land is released on a specific date) to market-driven releases.

In identifying the need for growth projects and planning these projects, Icon Water consults with ACT Government agencies and developers.

Projects are identified by analysing service strategies for new urban developments and through modelling of the system to identify areas where expansion is necessary to maintain service levels. In addition, the capacity of the treatment plants is also analysed based on projected demand.

The process for determining forecast growth capex takes account of:

- the available capacity of existing systems (network, treatment and reservoirs)
- modelling of water security to ensure compliance with standards (for example time in water restrictions)
- major future public and private development
- assessed capacity and performance of the distribution network assets and impacts of asset failures on network supply
- discharge to the environment conditions
- reliability risks and capacity priorities
- compliance with technical standards and requirements of the Utilities Technical Regulator (UTR)

- maintenance of service standard performance
- health, safety and environmental issues.

The ACT Government's current land release program is forecasting the development of around 16,434 dwelling sites across the ACT between 2021–22 and 2025–26. This is supplemented by private sector releases of approximately 7,500 new dwellings. This would be an increase of over 12 per cent in dwelling numbers that will require water and wastewater services. The majority (70 per cent) of these are expected to be multi-unit dwellings. In addition, the ACT Government's current land release program is for about 500,000m^2 of additional non-residential land across the ACT between 2021–22 and 2025–26.[7]

Growth driven projects have been based on the ACT Government's land release program, and the type of development proposed. Icon Water produces high-level, long-term infrastructure plans that are refined in consultation with the ACT Government and developers as more detail is known about land releases and growth requirements.

The Capital Contributions Code defines how growth projects are funded – entirely by Icon Water, entirely by the developer, or co-funded by both. The below forecasts include projects funded entirely by Icon Water and the total cost of projects that are co-funded by developers.

Forecast water and wastewater growth capex is set out in Table 7-26.

[7] ACT Government, Indicative Land Release Program 2021–22 to 2025–26, 2021.

Table 7-26: Forecast growth capex ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Water						
Water network	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Water sources	$0.0	$0.0	$0.0	$0.0	$0.3	$0.3
Water treatment	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total growth capex – water	$0.0	$0.0	$0.0	$0.0	$0.3	$0.3
Wastewater						
Sewer network	$3.0	$13.7	$4.3	$4.0	$5.3	$30.4
Sewer treatment	$16.8	$9.5	$27.0	$62.6	$71.0	$186.9
Total growth capex – wastewater	$19.8	$23.2	$31.4	$66.6	$76.3	$217.3
Non-system						
ICT	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Fleet and equipment	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Land and buildings	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total non-system capex, growth	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total growth capex	$19.8	$23.2	$31.4	$66.6	$76.6	$217.6

Source: Icon Water.
Note: Totals may not sum due to rounding.

Key growth projects for the 2023–28 regulatory period are outlined in Table 7-27.

Table 7-27: Key projects – growth wastewater assets

Project / program	Project overview and benefits
LMWQCC Secondary Treatment Bioreactors	This project is proposed to address the region's population growth. The current secondary treatment bioreactors are at capacity and require expansion to accommodate ACT population projections. Work to date has focussed on ensuring this expansion accommodates the long-term Wastewater System Strategy, including ensuring due consideration of all adaptive pathways. Plans are also seeking to use the opportunity to review our holistic treatment process to ensure the plant's efficiency is maximised. As discussed earlier the project is currently assessing four short-listed options including: • Option 1 – Conversion of existing reactors to Membrane Bioreactor (MBR) • Option 3 – Duplication of the existing process (with upgraded technology) • Option 4 – Aerobic Granular Sludge (Nereda) • Option 5 – Integrated Fixed Film Activated Sludge (IFAS) These works link to our customer outcomes of prepare and plan for the future; as well as care for and protect the environment.
North Canberra Sewer Augmentation	This project is identified to support growth in the North Canberra region in line with ACT Government planning strategies and to protect the environment from wet weather overflows in line with Icon Water's requirements under the ACT EPA approved "Canberra Sewer Network Environmental Plan, 2021" along with Icon Water's own technical standards. Early planning studies have shown that the likely solution is a sewage attenuation tank within the future Acton waterfront development area to accommodate peak flows from the development area as well as the wider catchment.
Fyshwick SPS Augmentation	This project is identified to support growth in the Fyshwick and Eastlake areas in line with ACT Government planning strategies and to protect the environment from wet weather overflows in line with Icon Water's requirements under the ACT EPA approved 'Canberra Sewer Network Environmental Plan, 2021' along with Icon Water's own technical standards. It will involve upgrades to ventilation assets at the Fyshwick SPS as well as augmentation of the hydraulic capacity of the station through increased emergency/attenuation storage volume and/or pump and rising main upgrades.

Source: Icon Water.

Forecast developer co-contributions under the Capital Contributions Code are provided in Table 7-28.[8] These amounts have been netted off the gross capex forecast for the purpose of forecasting Icon Water's revenue requirement, as the cost will be shared by developers through the Precinct Charge rather than being borne by Icon Water's broader customer base.[9]

Table 7-28: Capital contributions ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Water	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Wastewater	$3.0	$14.4	$4.7	$4.5	$6.0	$32.7
Total capital contributions	**$3.0**	**$14.4**	**$4.7**	**$4.5**	**$6.0**	**$32.7**

Source: Icon Water.
Note: Totals may not sum due to rounding.

Regulation capex

Regulation driven capex of $21.41 million accounts for three per cent of Icon Water's capex program and includes $11.89 million on water assets, $7.84 million on wastewater assets, and $1.68 million on non-system assets.

The process for determining forecast regulation driven capex takes account of:

- the performance of existing assets in relation to legislation and standard levels
- compliance with technical standards and requirements of the UTR
- reliability risks and capacity priorities
- asset performance, procedures and condition of assets
- meeting service standard performance
- health, safety and environmental issues.

Forecasts for regulatory driven capex are based on known or anticipated changes in regulatory requirements at the time of preparing this proposal and project requirements to meet these changes. Although ACT Health has flagged potential changes to the drinking water guidelines to move to health-based targets, there is no timing on this change at the moment.

Forecast water and wastewater regulation capex is set out in Table 7-29.

[8] There are some minor inconsistencies between the forecasts and Icon Water's 2022 submission to the Commission due to variations in project cashflow timing assumptions.

[9] Capital contribution outlined in table Table 7-28represent the amount developers will co-fund and does not include infrastructure entirely funded by developers.

Table 7-29: Forecast regulation capex ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
Water						
Water network	$4.3	$0.5	$0.0	$0.0	$0.0	$4.9
Water sources	$0.0	$0.3	$0.0	$0.2	$0.4	$0.9
Water treatment	$1.2	$1.8	$3.1	$0.0	$0.0	$6.1
Total regulation capex – water	$5.5	$2.7	$3.1	$0.2	$0.4	$11.9
Wastewater						
Sewer network	$1.8	$0.6	$0.0	$0.0	$0.0	$2.4
Sewer treatment	$0.4	$1.0	$2.2	$1.7	$0.0	$5.4
Total regulation capex – wastewater	$2.2	$1.7	$2.2	$1.7	$0.0	$7.8
Non-system						
ICT	$1.7	$0.0	$0.0	$0.0	$0.0	$1.7
Fleet and equipment	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Land and buildings	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total non-system capex, regulation	$1.7	$0.0	$0.0	$0.0	$0.0	$1.7
Total regulation capex	$9.4	$4.4	$5.3	$2.0	$0.4	$21.4

Source: Icon Water.
Note: Totals may not sum due to rounding.

Key regulation projects for the 2023–28 regulatory period are outlined in Table 7-30, Table 7-31 and Table 7-32.

Table 7-30: Key projects – regulation water assets

Project / program	Project overview and benefits
Googong WTP Improvements for Water Quality	Allowance has been made in the 2023–28 regulatory period to progress this project to determine a feasible option forming the basis of the business case. Googong WTP receives supply from the Queanbeyan and Murrumbidgee river catchments. These catchments are under increasing developmental pressure and are experiencing declining water quality. Googong WTP requires multiple barriers to produce safe drinking water. It is expected that construction activity for this project will not begin until the 2028–33 regulatory period, however there is a risk that the decline in water supply quality will trigger the need to construct the preferred solution earlier than expected.

Source: Icon Water.

Table 7-31: Key projects – regulation wastewater assets

Project / program	Project overview and benefits
LMWQCC Non-Potable Water System Upgrade	This project is to upgrade the existing non-potable water supply at LMWQCC which is required for daily operational activities and for emergency protection (firefighting flows). The system is required to comply with the provision of recycled water under the Utilities Act 2000 and the Environmental Protection Act 1997 (ACT). Due to the age and condition of the assets within this system there is a risk of non-compliance. The non-potable water system will also need to cater for increasing demands into the future while maintaining adequate performance.

Source: Icon Water.

Table 7-32: Key projects – regulation non-system assets

Project / program	Project overview and benefits
Cyber for SOCI	This project will deliver the upgrade of the following technology and processes to achieve compliance with the Security of Critical Infrastructure (SOCI) Act legislative changes across Icon Water's ICT and OT environment: • adherence to defined Cyber Security Framework • maturity assessment and gap analysis • risk management • cyber security controls Further information on Icon Water's new and additional SOCI obligations is provided in **Attachment 6: Operating expenditure**.

Source: Icon Water.

Efficiency capex

Icon Water's efficiency capex projects are works that will reduce costs or improve the performance of an existing infrastructure asset. Icon Water's forecast for investment in efficiency projects over the 2023–28 regulatory period is $19.7 million, including $3.7 million for water assets, $9.8 million for wastewater assets and $6.3 million for non-system assets.

The process for determining forecast efficient capex takes account of:

- reliability risks and capacity priorities
- asset performance, procedures and condition of assets
- meeting service standard performance
- potential operating expenditure efficiencies
- environmental issues.

Table 7-33: Forecast efficiency capex ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Average
Water						
Water network	$0.4	$2.1	$0.1	$0.0	$0.0	$2.6
Water sources	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Water treatment	$0.0	$0.0	$0.1	$1.0	$0.0	$1.1
Total efficiency capex – water	$0.4	$2.1	$0.2	$1.0	$0.0	$3.7
Wastewater						
Sewer network	$0.0	$0.0	$0.3	$0.7	$0.0	$1.1
Sewer treatment	$2.2	$0.7	$0.5	$5.3	$0.0	$8.7
Total efficiency capex – wastewater	$2.2	$0.7	$0.8	$6.0	$0.1	$9.8
Non-system						
ICT	$0.7	$0.6	$2.9	$2.0	$0.0	$6.3
Fleet and equipment	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Land and buildings	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total non-system capex, efficiency	$0.7	$0.6	$2.9	$2.0	$0.0	$6.3
Total efficiency capex	$3.2	$3.5	$4.0	$9.0	$0.1	$19.7

Source: Icon Water.
Note: Totals may not sum due to rounding.

Key efficiency projects for the 2023–28 regulatory period are outlined in Table 7-34.

Table 7-34: Key projects – efficiency wastewater assets

Project / program	Project overview and benefits
Net-zero/eMission Possible	This project will reduce our overall energy use profile and assist in reaching interim targets to achieve net zero by 2045. Initial stages of this project include additional monitoring of fugitive emissions at LMWQCC and enhanced process control. In addition to the identified engineering actions, allowance has been made to facilitate planting of new trees associated with managing our Australian Carbon Credit Units (ACCU).

Source: Icon Water.

Non-system capex

For the 2023–28 regulatory period, forecast non-system capex and its allocation between water and wastewater expenditure has been provided at a driver level above, but is set out below together to provide a whole of non-system capex view.

Forecast non-system capex is for projects that are not directly within the operational networks, such as ICT expenditure and corporate facilities.

Non-system capex forecasts take into account:

- business requirements
- data requirements for operational, regulatory and financial purposes
- data security
- condition of existing buildings and ICT systems
- risk management review and prioritisation
- the need to be able to respond to business needs and external regulatory compliance requirements
- consideration of efficiency improvements.

Forecast non-system capex is set out in Table 7-35.

Table 7-35: Non-system capex ($million, 2022–23)

	2023–24	2024–25	2025–26	2026–27	2027–28	Total
ICT	$5.0	$9.3	$14.8	$13.9	$6.5	$49.5
Fleet and equipment	$7.3	$3.9	$3.0	$0.9	$4.3	$19.5
Land and buildings	$12.0	$5.6	$0.6	$0.6	$0.6	$19.3
Other	$1.0	$0.6	$0.3	$5.4	$0.0	$7.3
Total non-system capex, regulation	$25.2	$19.4	$18.8	$20.8	$11.4	$95.6

Source: Icon Water.
Note: Totals may not sum due to rounding.

Key non-system projects for the 2023–28 regulatory period are outlined in Table 7-36.

Table 7-36: Key projects – non-system assets

Project / program	Project overview and benefits
Enterprise Resource Planning (ERP) Capability	Icon Water intends to continue to enhance the capability that we started to develop during the 2018–23 regulatory period, with the following technology/processes: • a procurement capability • contract management capability • human resources capability • billing capability • robotic process automation (RPA) and automated workflows. Benefits of enhancing and extending ERP capability include:

Project / program	Project overview and benefits
	• stronger governance, increased accuracy, and enhanced transparency due to the automation of current manual processes • better reporting and analysis, stronger governance and better contract compliance due to linking a contract management capability to the procurement function • streamlined payroll processes due to an integrated human resources solution • an in-house billing capability that will allow Icon Water to more readily accommodate the move to smart meters and unit metering as these will have a significant impact on the billing process.
Asset Management Information Systems	This initiative considers the enhancement and extension of capabilities across the Asset Management Information System (AMIS). The technology and processes covered include: • existing and new AMIS capabilities • solutions to be integrated with AMIS, such as customer systems and Supervisory Control and Data Acquisition (SCADA) • improved integration and information sharing between geospatial, financials and AMIS • mobility solutions. Benefits of enhancing and extending capabilities across the AMIS include • reductions in risk of error, delay and loss of productivity due to the elimination of manual workarounds • an enhanced staff and customer experience due to system integrations that bring a single view of asset and single view of customer • an improved asset lifecycle management at a lower overall cost due to systems being connected • growing out analytic capability.
Network Modernisation Roadmap and Delivery	A network modernisation roadmap will deliver upgrades of the following technology and processes to enable a more enhanced, streamlined and secure network: • enhancing secure connectivity with a fully digital SCADA network • enhanced sections of existing network types, as required, in the Icon Water environment (ie. radio, microwave, Wi-Fi, ethernet) into a single connected network solution based on IP communications. This is expected to address

Project / program	Project overview and benefits
	any modernisation required in remote site and telemetric radio network connectivity.

Source: Icon Water.

Abbreviations and acronyms

ACT	Australian Capital Territory
ACCU	Australian Carbon Credit Units
AMIS	Asset Management Information System
BTP	Business Transformation Program
capex	Capital expenditure
CDS	Concept development statement
Commission	Independent Competition and Regulatory Commission
CSA	Corporate Services Agreement
CSCSA	Customer Services and Community Support Agreement
DSP	Development stage proposal
ERP	Enterprise resource planning
FBC	Fluidised Bed Combustion
FMEA	Failure Mode Effect Analysis
ICT	Information and communication technology
IFAS	Integrated Fixed Film Activated Sludge
IPaD	Investment planning and development
IRC	Investment Review Committee
km	Kilometre
LMWQCC	Lower Molonglo Water Quality Control Centre
MBR	Membrane Bioreactor
ML	Megalitre
MW	Megawatt
PV	photovoltaic
RBA	Robotic process automation
SCADA	Supervisory Control and Data Acquisition
SOCI	Security of Critical Infrastructure
UTR	Utilities Technical Regulator

WTP	Water treatment plant