ATKINS

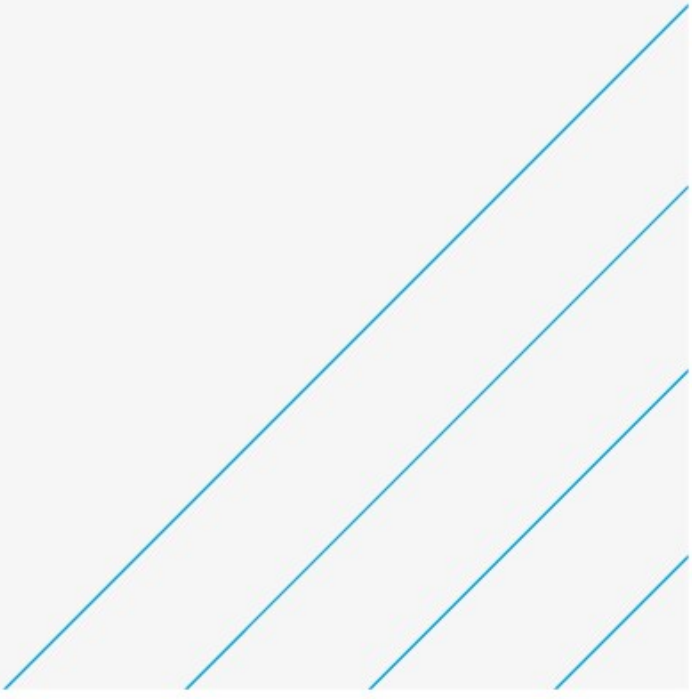
Member of the SNC-Lavalin Group

Sydney Water Expenditure and Demand Review

Supplementary Report

IPART

09 June 2020



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Rev 2.1	Final Report following IPART Review	GJ/SJI/JNSJ/SW	SJI	GJ	GJ	22/05/2020
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Rev 3.1	Final Report following SWC Review	GJ/SJI/JNSJ/SW	SJI	GJ	GJ	09/06/2020

Contents

1. Introduction

1.1. Terms of Reference

In June 2019 the Independent Pricing Tribunal of New South Wales (IPART) appointed the Atkins/Cardno consortium to carry out a detailed review of Sydney Water Corporation's operating and capital expenditure, and demand. The purpose of this review is to inform the Tribunal's Determination on prices for the upcoming price control period which will apply from 1st July 2020 to 30th June 2024.

IPART issued its Draft Determination and Report in March 2020. Sydney Water submitted a response to this Draft Determination in April 2020. We were subsequently asked by IPART to review Sydney Water's response and report our findings to the Tribunal. This report has been prepared in accordance with the Terms of Reference set out in the contract between Atkins/Cardno and IPART dated 5 July 2019.

1.2. Sydney Water submission to IPART

Sydney Water submitted a report to IPART dated 27 April 2020 making representations on a range of issues in the IPART Draft Determination Report. Our Terms of Reference asked us to review those areas of operating and capital expenditure and demand which were challenged by Sydney Water. There related to:

- Our review methodology and approach
- Continuing and catch-up efficiency
- Operating expenditure adjustments:
  - Reactive maintenance
- Capital expenditure:
  - Prospect to Macarthur (Promac) pipeline
  - Growth expenditure
  - Critical sewer renewals
  - Wet Weather Overflow Abatement Program
  - Other renewals programs (Stormwater, Reservoirs, Wastewater Treatment Plants)

1.3. Review process

Sydney Water provided us with a pre-briefing of their response submission on 24 April 2020. We received Sydney Water's response submission on 27 April 2020 and subsequently held a series of teleconference meetings that week on specific areas of material importance:

- Promac pipeline
- Environmental expenditure including:
  - Operational reactive maintenance
  - Critical sewers renewals
  - Wet Weather Overflow Abatement
- Growth and Demand

Atkins/Cardno would like to take the opportunity to thank Sydney Water Corporation for making its staff available for the teleconference interviews and for the professional and prompt manner in which the organisation responded to our challenges and requests for further detail.

2. Efficiency

2.1. Review process

In arriving at the recommendations in our Draft and Final Reports and this Supplementary Report, we have applied a three stage approach to reviewing the efficiency and prudence of expenditure, as summarised in Figure 2-1. This methodology is consistent with that applied by us in the previous review of Sydney Water and for other regulatory reviews across Australia.

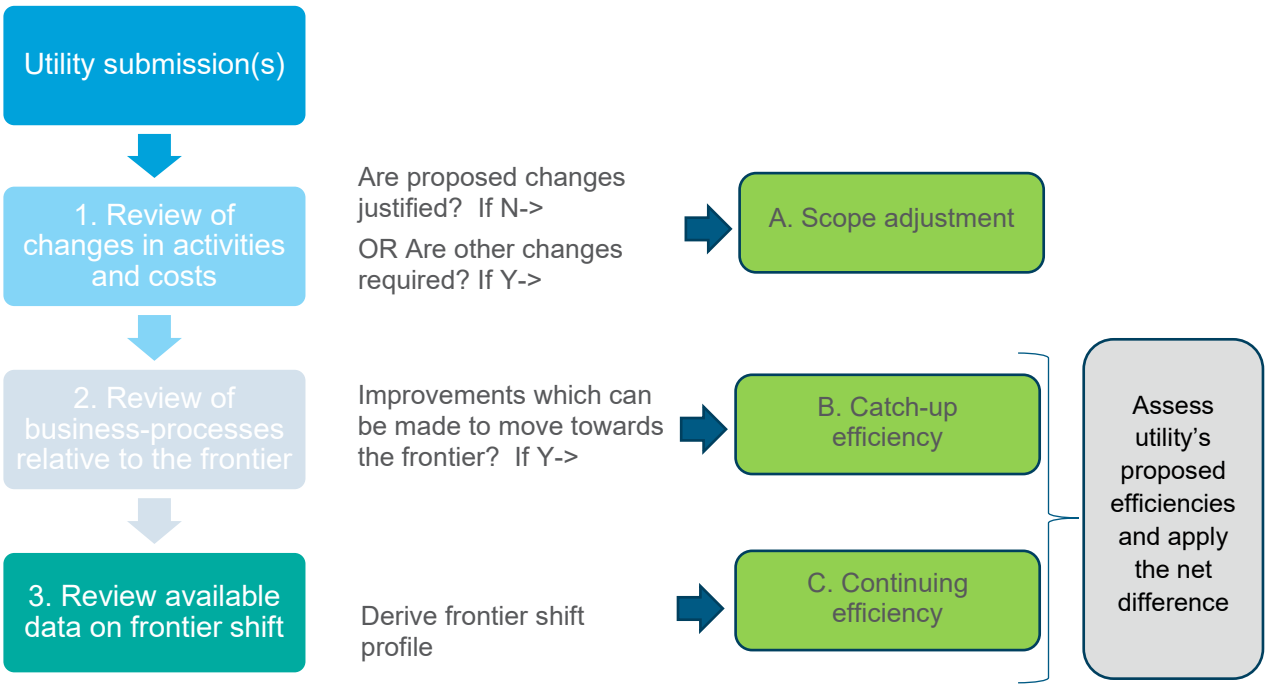


Figure 2-1 Approach to assessing efficiency

1. Review of changes in activities and costs

This step involves identifying inefficiencies within proposed changes to a utility's specific programs and does not apply to base expenditure to avoid double counting with Step 2. These adjustments are clearly distinct from the types of efficiencies identified in Step 2 in that they correct for an imprudent or inefficient proposed change to a utility's activities (and associated costs) rather than the business processes employed by the utility to deliver the utility's services. If the utility's proposed changes in activities (and associated costs) are not efficient, a **scope adjustment** is made.

2. Review of business-processes relative to the frontier

This step identifies the effectiveness of business processes (e.g. decision-making and procurement processes) relative to a benchmark frontier company. Where we identify improvements that can be made relative to the benchmark, a **catch-up adjustment** is made. This encourages the utility to move to the efficiency frontier.

We then recommend a level of catch-up we consider the utility will be able to make in the next Determination Period.

3. Review available data on frontier shift

We consider a number of data points such as the efficiency gains of well-performing utilities and broader productivity trends (e.g. multi-factor or total factor productivity). This recognises that in competitive markets firms must innovate to achieve continuing efficiency gains over time.

We compare the total efficiency challenge we derive from steps (2) and (3) with the efficiencies applied by the utility in its own submission. We then apply the net difference as an adjustment to the utility's submission.

2.1.1. Should continuing efficiency only be applied to part of the program?

In its response, Sydney Water makes the case that continuing efficiency should only be applied to capital maintenance. It makes this case by reference to the approach taken by Ofwat, stating for example:

> *"Atkins suggests its approach is justified in setting "appropriate efficiency targets"[26] because this is what Ofwat does. This is a mischaracterisation of Ofwat's approach. Ofwat only applies continuing efficiency (frontier-shift) to capital maintenance, not all capital expenditure. It does so precisely because the allowance for capital maintenance is based on historical costs, whereas the allowance for capital enhancement is based on forecast cost. Therefore, $37m (45%) of the $83m reduction for continuing efficiency should be reinstated in our capex program, with 45% representing the share of our program that we do not classify as related to capital maintenance."*

Similar points are also made in Attachment 1 to its response document, for example:

> *"However, Atkins mischaracterises Ofwat's approach; while Ofwat applies frontier shift to the capital maintenance element of capex (which are based on historical costs), it does not do so for capital enhancement activities (which are based on forecast costs), as we describe in Section 4.1"*

We consider that it is reasonable to expect Sydney Water to make continuing efficiency across its program including enhancement expenditure. Whilst it is clear that Ofwat does indeed apply a frontier shift efficiency to capital maintenance, it is important to note that:

- For PR19, Ofwat applied frontier shift of 1.1% p.a. to 86% of totex. It did not just apply frontier efficiency to capital maintenance.
- Frontier efficiency was applied to all wholesale "base totex" which, under the definition Ofwat adopts, makes up the vast majority (75%) of expenditure. Ofwat's definition of base totex includes expenditure more typically classified elsewhere as 'enhancement' or 'growth', for example, expenditure associated with new developments, growth at sewage treatment works, reducing internal sewer flooding and low-pressure issues.
- Ofwat also applied frontier efficiency to the environmental and water metering enhancement programs. At £4.8b, the environmental program is the largest area of enhancement expenditure. Taken together with metering, it makes up nearly half of enhancement totex.
- The challenge Ofwat applied to enhancement totex was significantly larger than it applied to base totex, leading to a 40% reduction (excluding the environment program)[1], even after companies had already accepted many of Ofwat's challenges[2].
- Ofwat did not apply frontier shift to some other categories of costs as they were already based on forward projections which incorporated efficiencies. As explained for retail (8% of totex) for example *"We continue not to apply frontier shift to retail costs as these are partly based on forward-looking costs, and reflect significant efficiency improvements from historic expenditure"*.[3]

We therefore consider that Ofwat's approach does not support applying frontier efficiency just to capital maintenance. We have therefore not made any changes to only apply continuing efficiency to part of the program.

2.1.2. Does our approach double-count efficiency savings?

Sydney Water's response raises concerns that the approach we have taken double-counts efficiencies by applying both top-down and bottom-up reductions to the same cost categories, and; by not taking into account that its submission already includes both continuing and catch-up efficiency already, as summarised below:

[1] See Table A1.3 in "PR19 final determinations: Securing cost efficiency technical appendix"
[2] Non-fast-track companies had already reduced their view by approximately 5.8% from their original business plans, see Section 1.1 in "PR19 final determinations: Securing cost efficiency technical appendix"
[3] See page 116 of "PR19 final determinations: Securing cost efficiency technical appendix"

> *"Atkins does not follow a clear framework for reviewing efficiency. It identifies three categories of cost reduction (continuing efficiency, catch-up efficiency, and other reductions due to prudency and scope reduction). These are however not mutually exclusive. It applies both top-down and bottom-up reduction to the same cost categories. This risks overstating the potential for cost efficiencies.*
>
> *The practical impact of Atkins' lack of a clear theory and transparent classification of efficiency savings is that it double counts the potential for cost savings. For instance, IPART (following Atkins) applies an additional frontier shift target to the forecast cost of capex because it considers Sydney Water's proposed costs do not include savings due to forecast productivity growth. However, cost reductions in our business plan are forecasts of our total future costs, including both frontier-shift (continuing efficiency) and catch-up efficiency. As a result, Atkins' forecast double counts frontier shift by requiring us to deliver both the frontier shift embodied in our capex forecasts and Atkins' estimate of the frontier shift across the economy as a whole. Atkins claims there is no double counting but this is only because it arbitrarily classifies our capex efficiency savings as all catch-up efficiencies. However, our internal efficiency challenge process was based on bottom-up, forward-looking costs and was designed to take account of all productivity gains that we could achieve."*

Our view is that:

- Inevitably there is a grey area when deciding which category to put some challenges in (scope or catch-up efficiency for example). However, we have been careful to avoid any double counting. The scope adjustments we have applied are clearly separate from catch-up efficiency, being focused on areas where Sydney Water has sought to carry out new or additional levels of activity.
- We have limited our application of capital catch-up efficiency to two programs where we consider that Sydney Water has clear potential to move to the efficient frontier.
- For operating expenditure, the level of continuing efficiency is similar to the efficiency already offered by Sydney Water, so is broadly consistent with the company's own view. For capital expenditure, we have not seen evidence that Sydney Water has applied dynamic efficiency, so we consider it is appropriate to apply frontier shift to take account of the company's ability to become more efficient during the Determination Period.

We therefore consider that there is no double-counting of the efficiency challenges applied. The catch-up and continuing efficiencies applied to operating and capital expenditure are addressed in further detail below.

2.2. Operating expenditure

IPART requires us to assess the efficiency of operating expenditure for the period from 1st July 2016 to 30th June 2020, to the extent necessary to assess the efficiency of the proposed operating expenditure, and; the efficiency of proposed operating expenditure for the period from 1st July 2020 to 30th June 2025.

In our Final Report[4], we explained that our adjustments to Sydney Water's submission to derive a prudent and efficient level of operating expenditure comprises three steps consistent with those set out above:

(i) adjustments for expenditure which is not considered prudent or the scope of work is greater than necessary to meet licence requirements;

(ii) a 'catch-up' adjustment to reflect the need for a utility to reach the efficiency of a frontier company, and;

(iii) a 'continuing efficiency' (known as Frontier Shift) to reflect the scope for further efficiencies in the future period from new technology and innovation.

We applied these three steps to the proposed operating expenditure. We comment on scope adjustments in Section 1.5.1 below and in Section 2. We also take into account the efficiencies proposed by Sydney Water in its

[4] Sydney Water Expenditure and Demand Forecast Review, Final Report Atkins January 2020

July 2019 and November 2019 submissions. We responded to several comments by Sydney Water on our Draft Report.

2.2.1. Scope adjustments

We have made adjustments to forecast expenditures where we consider these are not justified or prudent. We have not made any scope adjustments to base operating activities, as efficiency adjustments are applied to this area of expenditure. Under (i) above, of the nine adjustments proposed in our Final Report, five have been agreed and four disputed by Sydney Water. The impact, shown in Table 3-1 below is an adjustment of $113.2m on future forecast expenditure.

Table 2-1 - Operating expenditure scope adjustments

Scope Adjustments	2016 period expenditure	2020 period			
($m 2019/20) year ending June		SWC July proposal	SWC Nov proposal	Atkins Draft Report	Atkins Final Report
Prospect Macarthur pipeline	0.00	0.00	39.00	-27.00	-39.00
Cascade supply upgrade	0.00	0.00	5.00	-2.50	0.00
Water reactive - inefficient leakage expenditure	171.40	223.90	223.90	-52.00	-40.00
Wastewater reactive/ environmental program	211.80	241.50	273.00	-42.80	-30.00
BOO water treatment - volume and treatment	380.10	395.10	407.00	-16.56	-7.71
Electricity	205.80	158.40	158.40	-4.24	-4.24
City Planning	10.00	32.00	32.00	-16.00	-16.00
Water conservation (to cost pass through)	0.00	0.00	20.00	-20.00	-20.00
Infrastructure resilience	0.00	0.00	8.00	-8.00	-8.00
Total	**979.10**	**1050.90**	**1166.30**	**-189.10**	**-164.95**
Change in scope agreed at Final Report	~	~	~	~	-51.71
Change in scope disputed at Final Report	~	~	~	~	113.24

The reasons we selected these items of expenditure for review were as a result of a significant forecast increase in expenditure above the 2016 Determination Period, or; there were additional items of expenditure, or; we questioned the basis of the assumptions underlying the forecasts, there is equitable sharing of risk between Sydney Water and customers and that customers should not pay twice . We have not applied scope adjustments to base operating expenditure.

Sydney Water's response to the draft determination made further representations on the disputed areas of expenditure which we discuss in Section 3 . The response accepted a $12m reduction for the Prospect Macarthur pipeline and a suggested a $6.6m increase for the BOO treatment plants. This results in a scope reduction of 9.2%.

Sydney Water has made representations on the IPART draft determination including scope adjustments. Our response to comments on scope adjustment are included in Section 2.1 above and are discussed in Section 2.2.1.

There is one adjustment where there is possible double counting for electricity expenditure where we set a target for additional renewals expenditure to offset grid purchases. We agree that there is double counting of scope

reduction and continuing efficiency. We have applied a continuing efficiency to electricity supplies and not applied any scope reduction. We discuss this issue in Section 3.6.

2.2.2. Catch-up adjustment

This element of efficiency is the catch-up from an agency's current position to that of the frontier utility or benchmark utility. We compared the performance of Sydney Water using two independent approaches. The benchmarking is primarily to compare Sydney Water with its peer group in Australia and the UK and not used in a deterministic manner to derive expenditure recommendations. We commented in our Final Report that:

> *"From the results of our high-level benchmarking analysis with water utilities in England and Wales, the extent of catch-up efficiency is similar to the efficiency proposals included in the July submission."*

We have reviewed the July 2019 efficiency savings summarised in Table 5-16 of our Final report. Sydney Water has not defined whether these efficiencies are 'catch-up' or 'continuing'. We reviewed several of these efficiency initiatives and found that they were mainly to bring activities to the frontier and could therefore be reasonably classified as 'catch-up'. Several of the initiatives have carried over from programs started in the 2016 period.

We have accepted these efficiency proposals which should, over time, bring Sydney Water to the frontier.

2.2.3. Continuing efficiency

Continuing efficiency, or frontier shift, relates to the ability of even the most efficient firms in the sector, those at the efficiency frontier, to become more efficient over time. In this regulatory context, a frontier shift estimate should reflect the pressures to become more efficient that utilities face in an open market. It reflects the continuing efficiencies being gained across all major sectors through process innovation and new systems and technologies that all well performing businesses should achieve.

In the Final Report, we applied a cumulative continuing efficiency of 0.8% per annum. The basis of this value was explained in Section 5.7.3., based on data from the Productivity Commission. The multi-factor productivity (MFP) data suggested that a sustained average annual Multi-Factor (MFP) improvement of between 0.6% and 0.8% is achievable in Australia. These results include performance from 1975-76 to 2017-18. They reflect economy-wide performance all industry sectors and all firms in each sector—not just frontier firms. In that sense, this range is conservative. This value is supported by the Ofwat analysis[5] carried out as part of the December 2019 Final Determinations for water utilities in England and Wales.

Sydney Water commented on our final report focusing on the methodology and application of the continuing efficiency to expenditure and the value we have applied. We respond to these comments in Section 2.1 and below

- MFP Analysis – selection of 0.8%:

  > *"The justification for adopting a frontier shift at the upper end of IPART's proposed range (0.6% to 0.8%) is internally inconsistent with the fundamental operating of the frontier company method."*

We are proposing a 0.8% efficiency target which is consistent with both the Productivity Commission findings and the level of continuing efficiency recently set by OFWAT in the UK for water companies in England of Wales, where the determinations have been accepted by most utilities. The selection of the 0.8% annual frontier shift represents the long-term average for the market sector of the economy represented by the twelve industries identified by the Productivity Commission. The other components of the whole economy are the non-market sector which we do not regard as being relevant to a firm that sells private goods such as water and wastewater services. It would not be appropriate to reduce the productivity target to reflect the comparatively poorer performance of the irrelevant non-market sector.

[5] PR19 Final Determination -Securing cost efficiency technical appendix, OFWAT December 2019

- MFP Analysis – water specific

  "Economy-wide MFP is not a suitable proxy for water utility productivity despite the energy sector depressing industry-wide estimates."

Many productivity initiatives are common across all businesses and sectors. Taking a wide view of all industries provides a balance of high and low productivity industries. In the UK estimates of productivity in the water sector have been higher than other sectors. There is also scope for further innovation in networks and treatment identified by leading companies.

- COVID-19: Sydney Water commented that:

  "Economy-wide capital and labour productivity, and investment, are likely to decrease in the short term."

We note from the impact of COVID-19 that the economy-wide capital and labour productivity and investment, are likely to decrease in the short term and these factors will impact on productivity. We agree that during the first year that there will be an impact on productivity with new working practices arising from COVID-19. However, we consider that after twelve months a utility should have developed and implemented new work processes and systems. At that point the impact of COVID-19 on productivity should be small.

The representations from Sydney Water concern our assumptions and methodology; there is no new information from the company or published data from other sources to influence our findings on continuing efficiency, other than the potential impact of the current COVID-19 pandemic.

While the impact of COVID-19 is uncertain in the short run, we propose that the application of the continuing efficiency should be deferred to year 2021/22. The impact of this change in efficiency profile is shown in **Table 2-2** below. The efficiency assumed in the draft determination was below that proposed by Sydney Water. Deferring the implementation of efficiencies by one-year results in a significant reduction in continuing efficiency proposed for the 2020 Determination Period.

2.2.4. Impact on the recommended efficiency

Sydney Water proposed operating expenditure efficiencies in the 2020 Determination Period as part of its July 2019 submission. Most of the $104m efficiencies related to specific initiatives.

In November 2019, Sydney Water provided an Update submission to include additional expenditure related to the drought. The submission also included a 'business-wide efficiency challenge'. Sydney Water wrote that:

> *"As a consequence of proposing the cost pass-through mechanism for uncertain costs, we are able to set a more ambitious efficiency target on our core operating expenditure. We have therefore included an efficiency reduction of $88.9 million in our overall operating expenditure forecast. This is in addition to the $104m of efficiency savings included in our original forecast."*

We summarise the efficiency proposals and our adjustments in Table 2-2 below

Table 2-2 - Proposals for continuing efficiency

($m 2019/20) year ending June	Date	2021	2022	2023	2024	Total
SWC Business-wide efficiency challenge	Nov 2019	5.10	15.7	26.1	42.0	88.90
Atkins Continuing Efficiency Draft Report	Dec 2019	10.09	20.36	30.34	40.52	101.31
Atkins Final Report	Mar 2020	8.13	16.43	24.60	32.85	82.01
Atkins revised proposals for likely impact of COVID-19	May 2020	0.0	8.13	16.43	24.60	49.16

Sources: as shown

The outcome of the analysis, prior to the COVID-19 adjustment, was that Sydney Water's efficiency proposals were not significantly different from our proposed continuing efficiency given the uncertainties of forecasting operating expenditure. The revised proposals have been applied to total efficiency proposals in Table 3-6.

2.3. Capital expenditure

2.3.1. Previous scope adjustments

Our approach is based on recommending a total envelope of efficient capital expenditure, we do not 'approve' projects as we propose increases and decreases across various project line items across the capital program.

In our Final Report we made adjustments to forecast expenditures where we considered these were not justified or prudent either in terms of scope or timing. Additionally, we made some scope adjustment recommendations in our Final Report that increased expenditure allowances and brought forward some expenditure. The table below shows the changes from Sydney Water's submission in November 2019, our Draft Report and our Final Report. Comparing the Sydney Water submission in July 2019 would not be helpful as there has been significant reclassifying of some expenditure between areas since this time.

Table 2-3 - Capital expenditure scope adjustments in the draft and final reports

Scope Adjustments	2020 period			
($k 2019/20) year ending June	SWC Nov-19 proposal	Atkins Draft Report (Oct-19)	Atkins Final Report (Feb-20)	Outcome
Prospect Macarthur pipeline	484,210	N/A	0	Disputed by SWC
General Growth - Water	303,737	196,437	247,881	Disputed by SWC
General Growth - Wastewater	763,731	638,731	583,537	Disputed by SWC
Dry weather overflows reduction program	122,132	85,054	85,054	Silent, assume agreed
Avoid fail (critical sewers) (including the overflows to waterways sub-program)	410,644	325,798	392,244	Disputed by SWC
Stormwater renewals	138,249	58,722	122,461	Disputed by SWC
Reservoir renewals (inc. Potts Hill)	122,721	75,262	105,804	Disputed by SWC
Wastewater Treatment Plant renewals (inc. Quaker's Hill/St Mary's)	532,104	392,415	527,407	Disputed by SWC
Water PS renewals scope	69,629	55,510	55,510	Silent, assume agreed
Upper South Creek Expenditure	370,200	304,900	446,100	Silent, assume agreed
Waterways Health	16,129	16,129	22,629	Silent, assume agreed
Wastewater Pumping Stations	94,054	114,054	114,054	Silent, assume agreed

For this table we have presented the scope adjustments to the non-critical (dry weather overflows reduction program) and critical sewer (avoid fail) programs separately. In our draft and final reports we analysed these programs together. Note that the figures above are for scope adjustments only and a program specific efficiency challenge was also applied to the critical sewers program. We discuss these programs in more detail in Section 4.1.3.

For some of the expenditure items, the reductions we recommended were much higher in our Draft Report. We reviewed additional information provided and adjusted our recommended expenditure between our Draft and Final Reports. Sydney Water have generally disputed any item where we have recommended a negative (decrease in expenditure adjustment). In their response document Sydney Water are silent on areas where we have increased (Quaker's Hill and St Mary's WWTP and civil works on Wastewater Pumping Stations) or brought forward expenditure (Waterways Health).

2.3.2. Catch up efficiency

In our Final Report we compared the total level of top-down efficiencies that Sydney Water applied to each capital program and the change in the applied level of efficiencies between the initial five-year program and the four year programs. We noted that an average level of efficiency challenge of 18% had been applied across each of the programs aside from:

i. Critical Sewers, and;

ii. Wet Weather Overflow Abatement.

These programs represented significant outliers where it appeared that no internal efficiency challenge had been applied. On this basis we recommended that catch-up efficiency adjustments of 18% be applied to these programs to reach the average 18% level that Sydney Water have applied themselves. We decided not to recommend any further catch-up efficiency adjustments at a whole of program level as we had done in previous reviews. We considered that Sydney Water's overall approach to program development in applying adjustments and efficiency challenges top-down demonstrated increased maturity and willingness to respond to its regulatory environment.

Sydney Water responded that:

> *"It is not consistent for IPART and Atkins to say that we do not merit a catch-up efficiency factor, because we ran an effective internal efficiency challenge and benchmark well against peer companies, but to then selectively override the results of our process to apply catch-up efficiencies to specific programs"*

The program level catch-up efficiencies that we recommended are reflective of the balance of Sydney Water's internal efficiency challenge. Whilst the overall total capital program level process compares well against peer utilities, the level of efficiency challenge Sydney Water applied at program level appears disproportionately more risk averse for these two identified programs.

We recognise that within Atkins Final Report and IPART's Draft Determination there may have been some inconsistency around what is and what is not termed a catch-up efficiency. For clarity and to avoid the perception of 'double counting' within our efficiency assessment, we are recommending a catch-up efficiency adjustment for these two programs which we identify separately in our updated recommended capital expenditure Table 4-16 and only after any adjustments have been made for scope, timing and justification.

For both the Critical Sewers and WWOA programs we have reflected on the progression of the programs and are now moderating our approach to applying the catch-up efficiencies. We consider that deferring the timing to achieve these 18% catch up efficiencies be deferred to the last two years of the period. We discuss the timing of the application for these efficiencies and the impact on our proposed expenditure in Sections 4.1.3 and 4.1.4 below.

2.3.3. Continuing efficiency

Continuing efficiency, or frontier shift, relates to the ability of even the most efficient firms in the sector, those at the efficiency frontier, to become more efficient over time. In this regulatory context, a frontier shift estimate should reflect the pressures to become more efficient that utilities face in an open market. It reflects the continuing efficiencies being gained across all major sectors through process innovation and new systems and technologies that all well performing businesses should achieve.

In line with our recommendations on continuing efficiency for operational expenditure and in our Final Report, we applied a cumulative continuing efficiency of 0.8% per annum for capital expenditure. There is no new information from Sydney Water or published data to influence our findings on continuing efficiency other than the potential impact of the current Covid-19 pandemic. Sydney Water advised that it is too early to assess the impact of the pandemic on capital expenditure. We recognise that management will be focused on maintaining services during this time of operational constraints and the need to upgrade safe working practices. We therefore propose that the continuing efficiency adjustment is deferred and applied from July 2021.

3. Operating expenditure

3.1. Sydney Water representations

In Sydney Water's response to the draft determination, it made representations in five items of operating expenditure and accepted adjustments to three further items. The items of expenditure, showing adjustments made in our draft and final reports, is shown in Table 3-1.

Table 3-1 - Items of operating expenditure

SCOPE ADJUSTMENTS	2016 Period	2020 period				
($m 2019/20) year ending June	Actual and forecast	SWC July proposal	SWC Nov proposal	Atkins Draft Report	Atkins Final Report	Outcome
Prospect Macarthur pipeline	0.00	0.00	39.00	-27.00	-39.00	$27m disputed
Cascade supply upgrade	0.00	0.00	5.00	-2.50	0.00	agreed
Water reactive - inefficient leakage expenditure	171.40	223.90	223.90	-52.00	-40.00	disputed
Wastewater reactive/ environmental program	211.80	241.50	273.00	-42.80	-30.00	Disputed
BOO water treatment - volume and treatment	380.10	395.10	407.00	-16.56	-7.71	further representation
Electricity	205.80	158.40	158.40	-4.24	-4.24	Disputed
City Planning	10.00	32.00	32.00	-16.00	-16.00	Agreed
Water conservation (to cost pass through)	0.00	0.00	20.00	-20.00	-20.00	Agreed
Infrastructure resilience	0.00	0.00	8.00	-8.00	-8.00	Agreed
Total	**979.10**	**1050.90**	**1166.30**	**-189.10**	**-164.95**	

We comment below on the items which Sydney Water has disputed.

3.2. Water Network Maintenance

The purpose of water network maintenance operating expenditure is to both prevent and respond to incidents in the water network including mains breaks and leaks in order to meet the licence requirements for continuity and pressure to customers and reduce leakage to its economic level. The impact of drought conditions in the 2016 Determination Period has resulted in increasing bursts and leakage. Sydney Water increased its resources and expenditure over this period to respond to this increase. Additional contractor resources were brought in to repair leaks.

In our Final Report we commented that the limited ability to detect and repair leaks at an early stage of breakout resulted in leakage being above the economic level. The lack of sufficient flow monitoring and leakage detection

technology hampered the ability of Sydney Water to locate and repair leaks before they 'broke out' above ground, a significant factor in managing increasing leakage.

Sydney Water provided an updated submission in November 2019 proposing an increase of $98m over the 2020 determination period. It commented that:

> *Previous droughts have varied in length but average duration is around five to seven years. We have now experienced a much higher workload for two years and expect that the condition-driven workload will stay high for at least two years. We have then assumed a gradual drop off in expenditure over the later years, to reduce risk to customers.*

The drought broke in early 2020 with heavy rain and reservoir storage increased above 80%. While there was a short-term increase in leaks and bursts after this rain; recent data, over a short period, indicate lower values.

Sydney Water, in response to the Draft Determination, provided additional performance data for year 2020 including the number of interruptions to supply, leaks and breaks on water mains and ancillary fittings. It commented that the $40m reduction in expenditure which we proposed in the Final Report was not justified because

> *"the repair work to fix broken mains and fittings need to be fixed regardless of performance but noting that leakage impacts are a consideration in how the response is managed."*

Sydney Water's proposed additional expenditure of an average $24.5m p.a. (above the July 2019 submission) through the 2020 Determination Period was based on the average of the 2017 and 2018 actual expenditure. This additional expenditure comprises mainly contractor costs and associated road reinstatement and traffic control.

We have reviewed our approach to maintenance expenditure for this Supplementary Report considering:

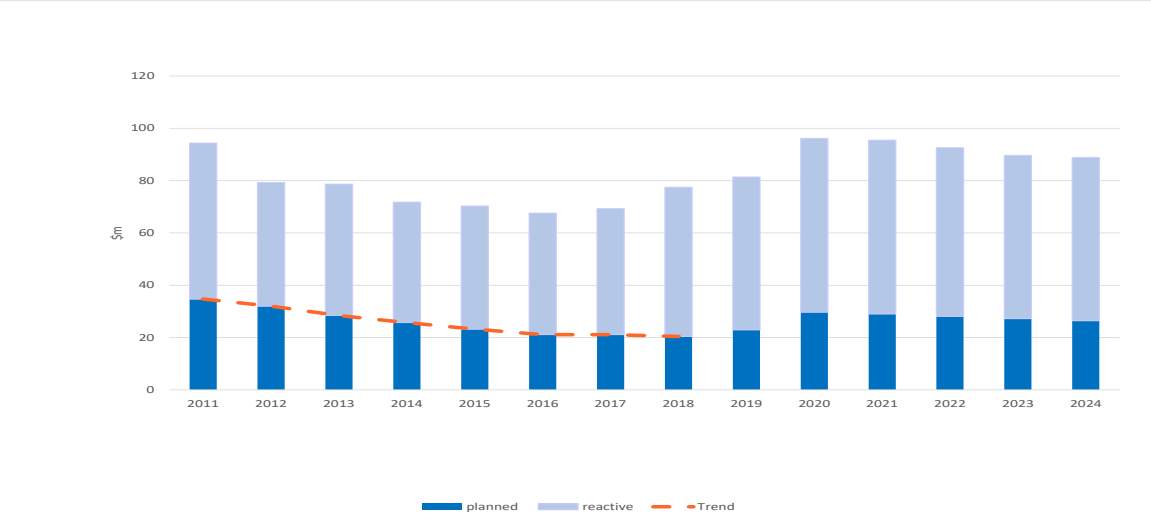
(i) The forecast additional planned maintenance expenditure;

(ii) The forecast additional reactive expenditure for asset repairs;

(iii) The impact of leakage being above the economic level.

The forecast additional planned maintenance expenditure

We commented in our Final Report that there was a reducing trend in planned (proactive) maintenance over the 2016 period from $28.4m in 2013 to $21.1m in 2017 and then increasing to $22.8m in 2019. Planned maintenance includes the inspection and repair of valves, meters and ancillary assets which are critical to the operation of the network as well as active leakage detection. The reducing trend in planned maintenance in the first part of the 2016 determination period is likely to have impacted on the ability to respond to increasing leakage on water main bursts and ancillary assets. Sydney Water increased its planned maintenance activities in 2019. In 2020, Sydney Water increased expenditure by $6.8m, a return to expenditure levels last seen in 2013The trends in planned and reactive expenditure are shown in Figure 3-1below.



Source: doc Supp 46.1, Atkins 2015 report and Atkins analysis

Figure 3-1 - Actual and forecast water service planned and reactive maintenance

In the 2020 period, Sydney Water proposed to continue planned maintenance expenditure at the year 2020 level with a declining trend to 2024. This additional work proposed was to address inoperable and inaccessible valves, and carry out valve inspection and repairs. Additional valves are planned to minimise the number of properties impacted during shutdown. In addition, Sydney Water proposed an increase in active leakage detection. Its objective is to be more efficient through a higher number of planned activities and reducing reactive work. The trend in actual planned and reactive expenditure to 2019 and forecast to 2022 is shown in Figure 3-1above.

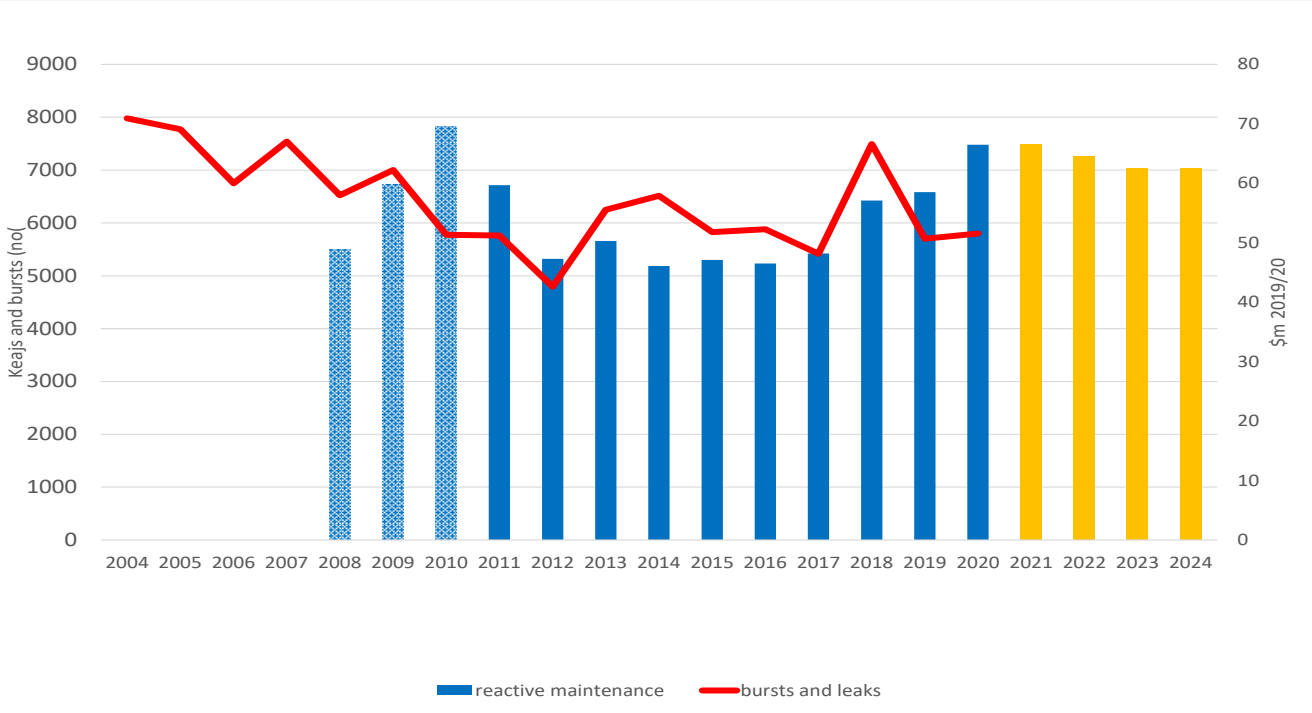
In our Final Report, we supported this level of expenditure for the 2020 period and commented that an integrated approach to flow monitoring and leakage detection activities is required.

The forecast additional reactive expenditure for asset repairs

We have reviewed the forecast activity of water main and ancillary repairs over the 2020 period and the efficient cost of this increased workload.

Sydney Water assumed in its November 2019 submission that the drought would continue through the greater part of the 2020 determination period and proposed an increase in expenditure above its original July 2019 submission. It forecast that the additional expenditure would be maintained over the four-year period with a small reduction by 2024. With the drought ending in early 2020 we have revisited the assumptions in the November 2019 submission.

We have taken a long run view of burst and leak trends as shown in Figure 3-2below. We have created a comparison of historical and proposed reactive expenditure over the same period on a common base. Data on bursts and leaks were available from 2004. Expenditure records are only available from 2008. Sydney Water provided actual and forecast expenditure from 2011 to 2024. To this we have added data from 2008 to 2011 (from the 2015 review) which we have adjusted to a base consistent with the Sydney Water data.



Source: doc 92.1. Supp 46.1, Atkins 2015 report and Atkins analysis

Figure 3-2 - Mains bursts and leaks v reactive expenditure 2004 to 2024

Forecast expenditure (2021 to 2024) is shown in the columns coloured amber. Columns in hatched blue are derived from earlier 2016 civil maintenance (CM) costs which we have rebased to provide a consistent time series data.

The graph shows mains bursts and leaks over the period. In addition, Sydney Water has provided the number of 'other asset leaks' over the period 2017 to 2019 and part of 2020. We summarise the actual expenditure and repair activity for years 2017 to 2019 in Table 3-2.

Table 3-2 - Actual reactive expenditure and total repairs

	2017	2018	2019	Total
Reactive expenditure ($m 2019/20) year ending June				
Actual expenditure	48.2	57.1	58.5	163.8
Repair activity (no)				
Bursts and leaks	5417	7493	5702	18612
Other asset leaks	7503	8026	8812	24341
Total repairs	12920	15519	14514	42953
Unit cost $/ repair	3731	3679	4031	3813

We have derived an average cost per repair for each year and as an average. We have not been able to derive average costs exclusively for burst or other asset repair.

We comment above that

(i) The reducing trend in planned maintenance in the first part of the 2016 determination period is likely to have impacted on the ability to respond to increasing leakage on water main bursts and ancillary assets; and

(ii) The shortfall of sufficient flow monitoring and leakage detection technology hampered the ability of Sydney Water to locate and repair leaks before they 'broke out' above ground was a significant factor in managing increasing leakage;

(iii) The delay in locating and repairing some leaks while they were relatively small is likely to lead to increased repair costs.

We have recommended accepting Sydney Water's proposed higher levels of planned maintenance expenditure in the 2020 determination period.

In forecasting repair costs into the 2020 determination period, we have derived an efficient average cost per repair with assumptions based on our experience of leakage management and repair in several water companies in England and Wales. We have assumed that

- burst repair costs are three times greater than other asset repairs;
- one third of bursts and leaks are 'detected' at an early stage of leak growth and before they become 'visible' on the surface;
- the repair costs for these 'detected' bursts are on average 75% of the 'visible' burst repairs.

Applying these assumptions to the combined activity and cost data for years 2017 to 2019 suggests that costs were some 6% greater in the 2016 period because of the shortfall in early repair intervention. We also note that the average unit cost of repair from the years 2013 to 2016 was 12% lower than the average cost for 2017 to 2019. Sydney Water explained possible reasons for cost increases due to urban density, some inaccessible areas and safety requirements although there is no apparent reason why these should change over the period from 2013. We were also advised that there is a change in legislation for waste disposal which could increase some costs.

We have assumed that average reactive maintenance savings of 6% can be achieved over the 2020 determination period, which is half the increase in unit costs from the 2013 to 2016 period. We have phased this saving over the period to allow time for new enhanced detection and repair processes to be implemented. This should allow Sydney Water to outperform these assumptions in later years.

With a return to average weather condition, the historical data suggests that there would be a reduction in mains and bursts over the next four years, although there is uncertainty as to the rate of reduction. We have therefore considered three scenarios for the total number of repairs over the 2020 period which is then used to derive a range of estimated expenditure.

(i) a continuing high number of repairs as implied by the expenditure proposed by Sydney Water in its November 2019 submission;

(ii) a reducing profile of total repairs as implied from the reducing burst rates following the 2007 drought;

(iii) a reducing profile of total repairs representing a median approach. This implies a longer period beyond 2024 and reflects a greater impact of the recent drought on the network than the 2007 to 2012 trend.

We looked at the impact of the previous drought in 2007 and the reduction in bursts and leaks in the following five years as the network returned to average conditions. Bursts and leaks reduced to around 5000 in 2012 compared with a peak in 2007 and earlier years. This indicates a 36% reduction over five years as the network returns to average conditions. We have included other asset repairs as a varying proportion of bursts and leaks.

We carried out a high level analysis using implied and forecast total repairs, the average repair costs and the varying proportion of 'other asset' repairs to burst repairs. We have applied an efficient repair cost as derived above.

We summarise the scenario analysis in Table 3-3 below.

Table 3-3 - Water reactive maintenance efficient expenditure

($m 2019/20) year ending June	2021	2022	2023	2024	Total	Source/ assumption
Scenario 1: continuing high level of bursts and leaks						
July 2019 submission	40.50	40.50	40.50	40.80	162.30	SWC balancing line
Additional in Nov 19 submission	26.00	26.00	24.00	22.00	98.00	SWC Update
Expenditure for scenario 1	66.50	66.50	64.50	62.80	260.30	SWC doc supp46.1
Implied total repair	17438	17438	16914	16468	68258	Using 201719 unit cost
Scenario 2: Bursts and leaks reducing similar to the 2007 profile						
Assumed total repairs	13780	13520	13260	13000		To 2007-2012 burst profile
Estimated expenditure	52.55	51.56	50.57	49.58	204.25	no efficiency applied
Scenario 3: bursts and leaks reducing at a median rate (including other asset repairs)						
Assumed total repairs	15609	15479	15087	14734		reducing over longer period
Expenditure for scenario 3	59.52	59.03	57.53	56.19	232.27	no efficiency applied
Impact of Scenario 3 to Sydney Water proposed expenditure						
Adjustment for scenario 3	-6.98	-7.47	-6.97	-6.61	-28.03	no efficiency applied
Efficiency (%)	2.4	4.8	7.2	9.6		
Adjustment with efficiency[6]	-8.40	-10.30	-11.11	-12.01	-41.82	

.

We conclude that Sydney Water's proposed expenditure as scenario (i) overstates the likely reduction in breaks and leaks and related workload now that the drought has ended. Conversely, assuming a decreasing level of bursts and leaks similar to the 2007 to 2012 period, as scenario (ii) might not reflect the lag effect of the drought on the network. Scenario (iii) assumes a reduction in bursts and leaks over a longer period which we consider the most likely outcome. This also provides a more equitable sharing of the cost risks between Sydney Water

[6] Note that an earlier version of this analysis and table, based on a total expenditure of $256.00m, resulted in an adjustment with efficiency of $39.54m. This revised Table 3-3 above was a result of a fact checking process and feedback from Sydney Water on 4th June 2020.

and its customer. The impact of assuming scenario (iii) is shown in Table 3-3 with a reduction of $39.54m on the proposed expenditure for the period. This still allows a significant increase above the July 2019 submission expenditure for this reactive maintenance, reflecting the potential medium-term impacts of the drought.

The impact of leakage above the economic level

In our Final Report, we noted that there were operational shortfalls in the management of the leakage detection and repair program. This is mainly because of the capability to detect and repair leaks in a timely way. This in turn reflected the shortfall in network flow and pressure monitoring and leakage detection using latest technology in place with frontier water utilities in England and Wales with similar bursts rates and requirements to achieve their own defined economic level of leakage. The impact has been that leaks are detected when they 'break out' with an increase in leakage significantly above the mean economic level. The cost of repairs and associated impacts is normally lower if leaks are detected at an early stage of their growth.

We accept Sydney Water's view that the purpose of the reactive expenditure is to repair broken and leaking pipes and fittings. However, had an effective leakage monitoring and detection system been in place then these leaks could have been found and repaired earlier. The impact has been that leakage was above the economic level of leakage (ELL) for some time and by definition this is inefficient. We note that whilst it is inefficient, in the current Determination Period, Sydney Water has incurred the cost of water lost and the expenditure on repairs with no significant impact on customers, except through marginally lower reservoir storage levels.

There is a requirement in the Licence which sets out the requirements for an economic level of water conservation, including leakage. The ELL has been estimated based by Sydney Water on the residual storage in the impounding reservoirs. Figure 3-3 below shows actual and forecast leakage compared with the ELL over time. When reservoir storage increased significantly during 2020, the ELL also increased.

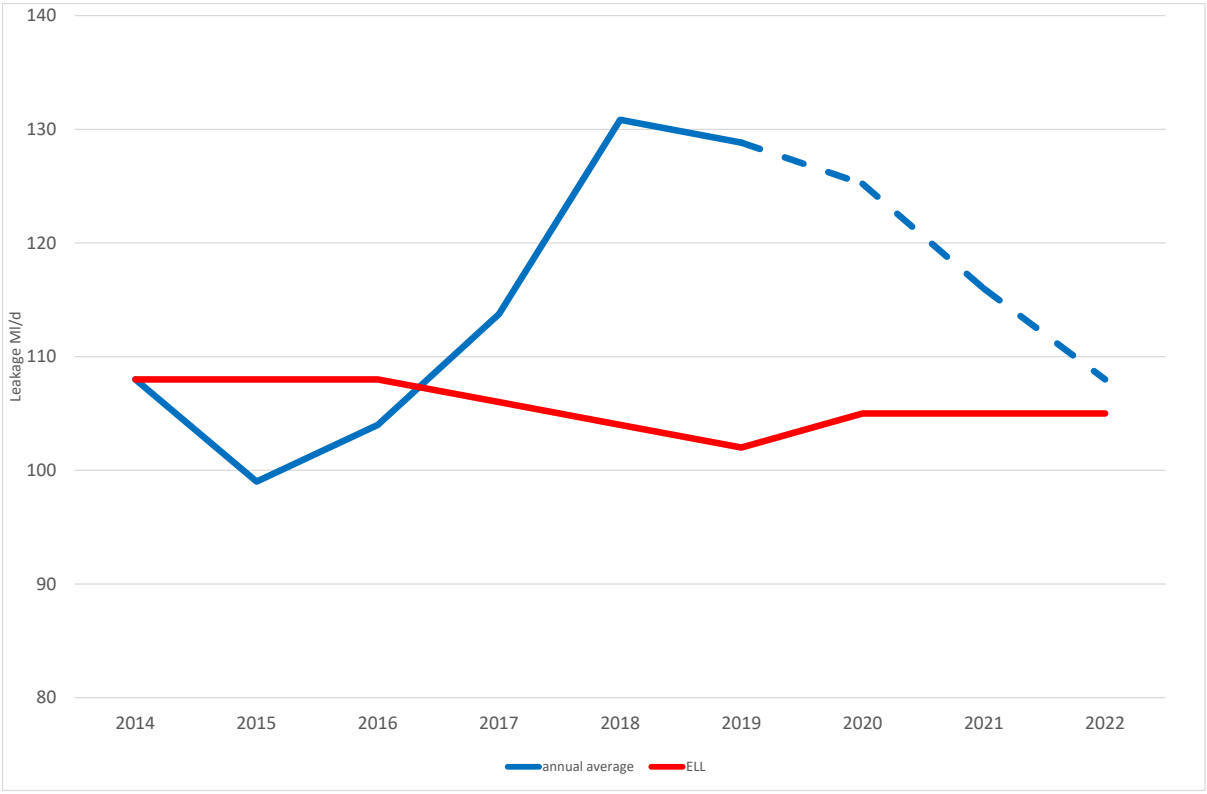


Figure 3-3 - Leakage performance against the ELL – actual and forecast

The forecasts for 2020 to 2022 are based on earlier discussions with Sydney Water where it proposed to reduce leakage to ELL by the end of 2022. Sydney Water was not able to provide a measure of total leakage in 2020 because of system problems; this is normally calculated using the integrated flow methodology every quarter.

We are required to recommend efficient expenditure for the 2020 period. Leakage above the economic level is inefficient. Where leakage in this period is above the economic level then customers should not be expected to fund the cost of water depleted from impounding reservoirs or the SDP together with expenditure on repairs. The higher leakage also potentially triggers the additional cost of water restrictions.

Sydney Water commented that:

> *"it should not be penalised for not investing in the high-cost leak detection technology for which there has been no clear justification in the past"*

Technology and innovation have moved fast in this area over recent years and it would be reasonable for a frontier company with significant burst rates to have continuous flow monitoring systems and associated leakage detection technologies in place to identify changes in flow and leakage well before it is visible on the surface. This would also enable reliable measures of leakage on a daily basis rather than wait for a three-month water balance. Sydney Water advised us that it is currently considering several alternative options to improve leakage management activities including activities such as district metering, leak sensing and pressure reduction. Monitoring is particularly relevant for a company with significant burst rates because of the impact of ground movements in parts of the network.

In our Final Report, we estimated the cost of water lost through leakage being above the economic level as $40.0m. With the refilling of reservoir storage in early 2020, the economic value of water lost has reduced from January 2020 and the ELL has increased. Our revised estimate is $32.35m is for the period to December 2019, taking into account the reduction in water from January 2020. We have compared this value with the 'under performance incentive rate' applied to companies in England and Wales. Both Severn Trent Water and Thames Water are in areas of limited water resources and elevated leakage constrains water availability; both companies have similar 'negative incentives' of the same order as we find for Sydney Water.

Table 3-1 shows how the value of water above the ELL has been estimated. We have applied a 'deadband' of 5Ml/d above the ELL where no value adjustment is applied. We also include as a comparator the 'underperformance incentive rate' value for Severn Trent Water calculated using the same leakage volumes and the unit rate included in the outcomes incentives for the recent determination[7].

We have used Sydney Water's methodology for assessment of ELL and its estimated short run value of water which increases as reservoir storage is depleted[8]. We note that applying Sydney Water's estimated long run marginal cost of water would have resulted in a higher, $48.5m, adjustment. Table 3-4 shows how we have derived the total volume of water lost through leakage above the ELL.

Table 3-4 - Value of water lost through excessive leakage (above the ELL)

Year (ending June)	*Average* leakage (Ml/d)	ELL (Ml/d)	Deadband (Ml/d)	Leakage> deadband (Ml/d)	Value of water $/kl	Value $m	*UK comparator (in $m)*
2017	113.75	105.0	5	3.8	0.75	1.03	*2.67*
2018	130.83	103.5	5	22.3	1.25	10.19	*15.87*
2019	128.83	102.4	5	21.4	1.75	13.69	*15.23*
2020[1]	125.20	102.0	5	18.2	2.25	7.45	*6.47*
Total $m						32.35	*40.24*

(i) Note that year 2020 is for the period from July to December 2019. Sydney Water was unable to provide this data so we derived values from the last six months of year 2019.

(ii) Value of water is estimated from Sydney Water's ELL graph based on the reservoir level at the end of the financial year.

We have applied this value of water lost through excessive leakage equally across the four years of the 2020 determination period.

In summary, we recommend an adjustment to expenditure related to leakage performance to reflect the indirect costs, social and environmental, of depleting a water resource at time of drought in that this has to be replaced

[7] Outcomes performance commitment Severn Trent Water, Ofwat, December 2019
[8] Doc 385 Economic level of leakage at varying dam levels, Sydney Water

by other resources and demand management measures. By definition, we use the value of water derived by Sydney Water based on the reservoir storage level as a percentage of total storage. The adjustment does not address the efficient repair costs or forecast workload which we discuss in reactive maintenance above.

We have applied this value of water lost through leakage above the ELL equally across the four years of the 2020 determination period.

We recognise that this is an adjustment is to take account of inefficiency during the current period rather than our view of efficient expenditure in the 2020 period and acknowledge it will be a matter for IPART to consider whether this is an appropriate approach to apply.

3.3. Wastewater reactive

The wastewater environment improvement program is a combination of operating and capital inputs to meet the EPL licence requirement, for each system, on the number of sewer chokes which cause dry weather overflows with the resulting public health and environmental impacts. Interventions to meet this licence requirement includes proactive, reactive and capital maintenance. Proactive maintenance includes CCTV inspections and root cutting and is normally carried out on sewers which have a have a high risk of impact to the environment. Reactive maintenance is carried out on the remainder of the sewer network where, by definition, there is a response to reported incidents of sewer spills. Capital maintenance is focused on sewers where the risk of failure is likely to have a significant impact on the environment, the community or increased costs. The current program of works is a continuation of reactive and proactive work and capital expenditure for dry weather overflows which has continued over many years.

Current performance against the sewer choke standard is shown in Figure 3-4. Note that there is an increasing trend in the 5-year rolling average from 2014 and before the recent drought although the long-term trend is reducing.

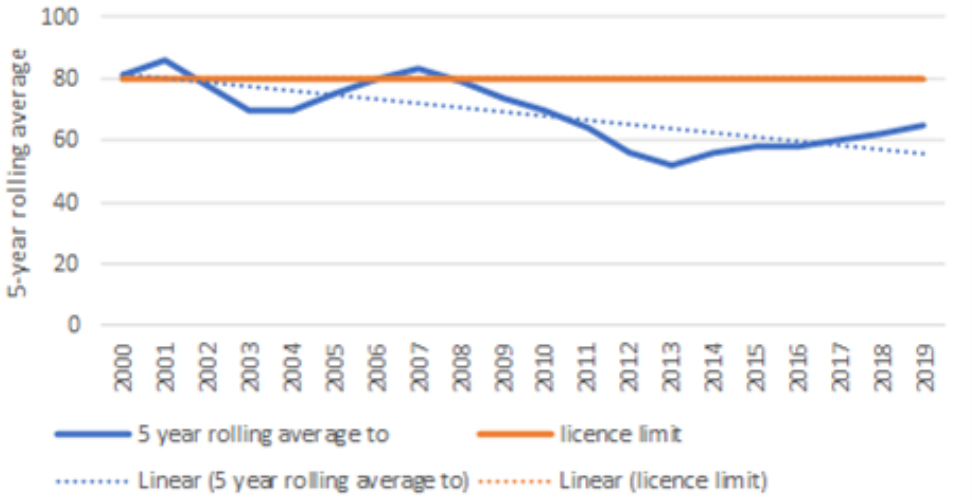


Figure 3-4 - Sewer choke performance per 100km of sewer against licence limit.

Sydney Water shows from monthly data that the number of blockages has increased significantly in the years 2018 and 2019 although reducing in 2020 apart from a peak period in February 2020 when the Sydney area experienced heavy rain and surface flooding. The increases in these recent years is attributable to tree root intrusion as soil moisture has reduced in the recent period of drought. Sydney Water states that the tree roots which penetrated the sewers will require removal as normal climate conditions return. It will take some time to reduce this backlog to a steady workload.

Sydney Water has proposed an increase in proactive maintenance to focus on CCTV surveys and tree root removal on sewers where any spillage is likely to impact on waterways. In our Final Report we supported this increase which follows from the 2012 and 2016 periods when proactive maintenance was reduced.

Sydney Water has provided new information:

(i) updating the number of dry weather overflows up to February 2020, and;

(ii) an audit report carried out by consultants as part of the Environment Protection Licence (EPL) obligations.

For (i) the number of sewer breakdown jobs for 2018, 2019 and to February 2020 shows an increase of 28% on the mean of the previous five years. In previous peaks in sewer choke performance in 2001 and 2007 it has taken two to three years to show a significant reduction in performance.

Item (ii) is to demonstrate the EPA expectations for Sydney Water to meet its EPL obligations although there is no change to these obligations.

The EPA had noted from its earlier compliance monitoring that there were widespread issues with Sydney Water's performance in relation to the timeliness and adequacy of clean-up, containment and environmental assessments. This report[9] examined Sydney Water's performance in response to reported overflow incidents including management of the response and the clean-up operations.

The consultants reported that Sydney Water increased its resources since October 2018, with 35 additional contractor resources and 32 network staff. They also commented that *the minimum resource requirements per incident or for the program overall was not determined* as insufficient records were available.

One of the recommendations (R28) was that:

> *"Sydney Water should demonstrate a commitment to rapid clean-up by developing a culture of 'urgency' in order to protect the environment, establish temporal targets for site clean up … and finding options to provide dawn to dusk containment and clean-up effort …"*

Sydney Water is developing a business case for the new processes and resource requirements but is not available for this review. It has estimated the additional resources as 80 contractors and 18 staff at an average cost of $14.7m.

In the November 2019 submission, Sydney Water proposed an increase in expenditure above the July submission with a total of $273m including contractors and own staff. The proposal is shown in Figure 3-5.

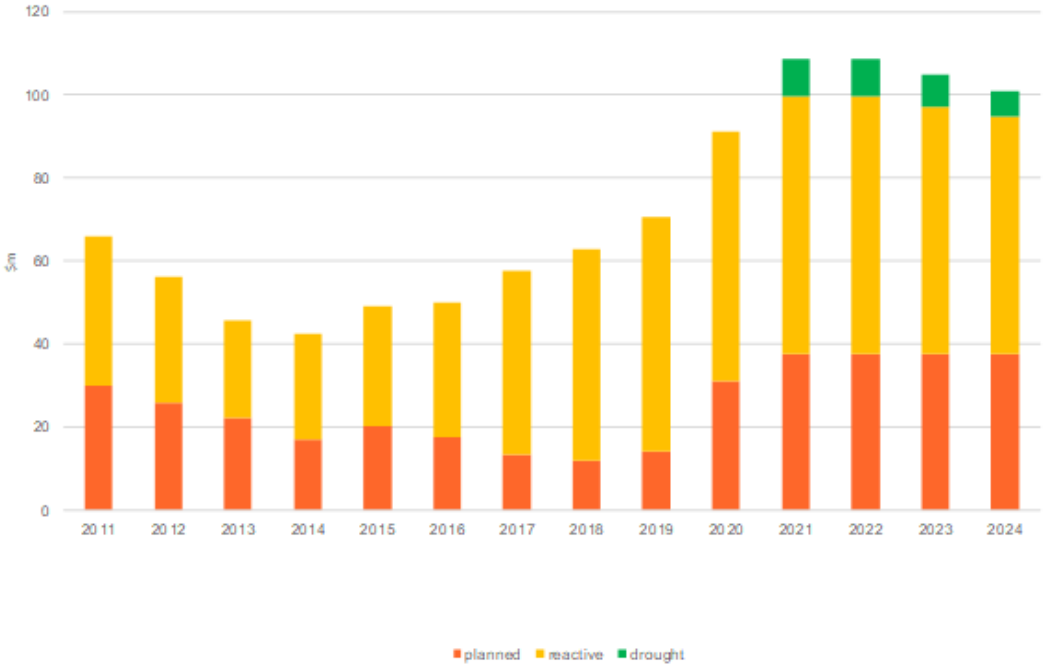


Figure 3-5 - Planned and reactive maintenance expenditure

Source: Sydney Water doc 414.1

[9] Sydney Water Corporation Dry Weather Sewage Overflow Response, GHD March 2020

In our Final Report we concluded that maintenance needs to be done to meet expectations of both the public, the EPA and licence requirements. At that time, we questioned whether some of the reactive expenditure could have been avoided by more effective asset management and a greater activity in for example in proactive CCTV work during the 2016 Determination Period. In addition, we found that reports of ineffective responses to incidents and clean-up may well be matters of more effective working and management.

We recognise from the additional information provided that there are additional pressures on the business to respond timely and effectively to sewer chokes and resulting clean-up which is a combination of more effective management processes and some additional resources to cover 'out of hours' events. However, we question whether the likelihood and consequence of dry weather overflows could be reduced by a more strategic approach using innovative solutions, including real time monitoring and targeted proactive work.

The EPA provided a submission on IPART's Draft Determination which included comment on Sydney Water's dry weather reactive maintenance program. While acknowledging the magnitude of the increase in Sydney Water's proposed expenditure and the position in the Draft Determination that efficiency gains could be achieved in this area, the EPA expressed concern that the expenditure reductions would put at risk Sydney Water's ability to achieve compliance. The EPA submission also notes that it will continue to investigate non-compliances and take appropriate regulatory action.

We have reviewed Sydney Water's proposed expenditure, the additional information provided with its comments on the draft determination and the comments from the EPA. We accept that the proposed increase in expenditure is significant and somewhat uncertain in some areas, there is a pressing need to reduce the risk of dry weather overflows and the effectiveness of responses.

However, the significantly increased level of reactive expenditure above the2016 period expenditure is not efficient as it does not deliver long term benefits. Sydney Water should be seeking to reduce the likelihood of dry weather overflows through proactive maintenance in order the reduce the high consequential costs of clean-up. There is flexibility within the allowed expenditure to carry out more proactive maintenance in those areas of high likelihood and consequence and deliver more tangible benefits. This outcomes from this expenditure should be revisited at the next determination.

We therefore make no adjustment to the maintenance expenditure proposed by Sydney Water in the November 2019 submission.

3.4. Prospect to Macarthur link

Sydney Water explained that this project is to service growth is areas adjacent to the pipeline in addition to resilience in linking sources. We comment in 4.1.1 on the need for and timing of the project and the related capital expenditure elements of the project. The operating expenditure relates to pumping and asset maintenance costs. Pumping costs to meet growth are likely to be low in early years as areas are developed. There will be a gradual increasing profile over time as new connections increase.

In our Final Report, we found the estimate of additional operating expenditure was overstated. We commented that while the methodology provides a basis to estimate indicative operating costs for option analysis, it does not relate to the likely operating expenditure on these assets across the business, taking into account the growth in demand over the 2016 and 2020 period, We have used actual and forecast expenditures in the Regulatory Cost Model (RCM) which includes maintenance costs for all pumping stations, pipelines and reservoirs to derive marginal cost increases for maintenance and pumping.

We proposed an efficient level of additional expenditure to be $19.0m compared with the $38.8m submitted by Sydney Water.

Sydney Water, in its response to the draft determination reported that the project had been delayed with a corresponding reduction in additional operating expenditure to $27m over the 2020 period There was no new information to change our finding from that set out in the Final Report, The level of efficient expenditure is therefore reduced pro-rata to the Sydney Water revised expenditure profile. The derivation of an efficient level of expenditure is shown in Table 3-5 below

Table 3-5 - Prospect to Macarthur link derivation of efficient expenditure

SYDNEY WATER OPERATING EXPENDITURE: PROSPECT MACARTHUR LINK					
$ 2019/20 Year ending June	**2021**	**2022**	**2023**	**2024**	**total 2021-24**
POSITION AT ATKINS FINAL REPORT					
SWC November 2019 submission	0.0	9.9	14.0	14.9	38.8
Atkins Final Report adjustment	0.0	-4.6	-7.6	-7.6	-19.8
Akins Final Report Efficient Expenditure	0.0	5.3	6.4	7.3	19.0
APRIL RESPONSE TO THE DRAFT DETERMINATION					
SWC April 2020 Counter proposal	0.0	7.0	10.0	10.0	27.0
Net savings proposed by SWC	0.0	-2.9	-4.0	-4.9	-11.8
PROPOSED EFFICIENT EXPENDITURE					
SWC April 2020 Counter proposal	0.0	7.0	10.0	10.0	27.0
Atkins adjustment pro-rata Final report	0.0	-3.3	-5.4	-5.1	-13.8
Akins Final Report Efficient Expenditure	0.0	3.7	4.6	4.9	13.2

We propose an efficient expenditure of $13.2m. This is a reduction of $13.8m compared to the revised expenditure proposed by Sydney Water.

3.5. BOOT treatment

Sydney Water purchases potable water from four BOOT plants at Prospect, Macarthur, and the combined Woronora and Illawarra plants. Prospect is the largest works and the main driver of expenditure. The operating cost of supply is driven by volume and water quality; mainly colour and turbidity and included in operating expenditure. Other costs are covered in the RAB.

In the Final Report, we stated that Sydney Water has an underlying assumption that future costs should reflect 'average' conditions and 'base' demands; those not impacted by drought restrictions or other significant exogenous event. Sydney Water is assuming higher colour values in the 2020 period and greater than the average for recent years. This is a risk averse approach and results in significant increases in treatment works costs which are likely to be overstated. We suggest that an efficient level of expenditure for the base case with average weather conditions and sharing the risk between customers and Sydney Water would be a $3.3m p.a lower than that proposed.

Sydney Water commented that raw water quality, in particular higher colour, is likely to deteriorate due to drought conditions. It added that:

> "We acknowledge that we would be adopting a low risk approach if we were to share the cost across the whole four-year period. Instead we therefore suggest that we bear the risk of an inflow event in the first two years of the determination and accept the Atkins reduction in these years but receive the full $3.3m /a in the last two years due to the impacts of growth and when rainfall events are more likely to occur."

At that time, we accepted this proposal as it shares the risk of deteriorating water quality between Sydney Water and customers.

Sydney Water provided further information in its response to the draft determination including recent raw water quality data. Significant rainfall occurred in early in 2020 breaking the drought and increasing reservoir storage to over 80%. There have been bush fires across the catchment areas. While water abstracted for treatment continues to be of good quality, well below the colour threshold, and unaffected by the fire ground inflow. However, the water quality is likely to deteriorate with elevated colour and turbidity when water in the Burragorang

lake (Warragamba) turns over in later winter. It may be necessary to supplement the Warragamba supply from other metropolitan sources and Prospect.

Our original assumption for the Prospect plant was based on historic values of true colour (hazen) and turbidity reported[10] by Sydney Water at interview in August 2019. This showed that for the period 2011/12 to 2018/19, average annual colour exceeded the 20 hazen value for two years out of seven; or 40% of total days in the period. Sydney Water had assumed for the 2020 Determination Period that colour would exceed 20 hazen for all four years. We considered this forecast to be overstated and placed all risk on customers. Following Sydney Water's comments on our draft report, we agreed with its proposal to share this risk of exceedance of the 20 hazen value equally between the company and customers. We changed our cost adjustment accordingly.

There is new evidence of probable deteriorating water quality from greater inflows, rather than drought conditions, which is likely to elevate colour levels in the raw water available at the plant. We are also advised that the Sydney Desalination Plant (SDP) is currently in operation to support potable water during the current period of high colour in bulk water sources. We identified the risk of elevated colour level at the Final Report when we agreed that this should be shared between customers and Sydney Water. We find there is no reason to change our view.There is therefore no change to the $6.6m reduction previously agreed with Sydney Water and included in our Final Report.

3.6. Electricity

Sydney Water comments on the adjustment made to electricity costs related to renewable energy targets.

In the 2016 determination period, Sydney Water proposed to source 329.0 GWh of renewable energy over the four years, although actual generation was 277.6 GWh, a shortfall of 51.4 GWh which was purchased from the grid. This is equivalent to $7.44m additional cost for grid purchases using the average unit cost over the period.

For the 2020 determination period, Sydney Water proposed to maintain a level total power requirement through energy efficiency, and to reduce grid supplies by nearly 3% by the end of the period with a corresponding increase in renewable generation. We had proposed a modest additional generation from renewals to reduce dependency on grid supplies from mainly gas generation plants. We had insufficient information to set a more challenging target.

Sydney Water commented that additional renewables would not meet its benefit/cost assessments for identified schemes and questioned whether the target would lead to prudent and efficient expenditure. We were not able to test this assertion but noted that other utilities such as the SDP and Yarra Valley Water were either fully reliant on renewable energy sources or were developing innovative solutions for generation.

We consider that this is an opportunity for Sydney Water to develop its renewables potential over this period as in the medium to long term there are significant pressures to move away from fossil fuel sources. This could lead to a more coherent renewables policy for further developments in subsequent years. Our proposed scope target would however double count the continuing efficiency applied to the whole of the electricity program. We concluded that Sydney Water would be best placed to promote innovative solutions for renewable energy generation under a continuing efficiency target.

3.7. Water Conservation

Sydney Water proposed a base level of water conservation of $10m p.a. in the 2020 determination period. This is a significant increase on expenditure in the 2016 period. This water conservation base program is linked to the economic level of water conservation. The method of establishing an economic level has been agreed with IPART and forms part of the Operating Licence.

Sydney Water also proposed enhanced water conservation measures based on the level of water restriction in place during a determination period. These enhanced programs are also based on the economic level of water conservation with higher unit water costs driving additional water conservation activities.

The DPIE commented on the water conservation expenditure proposed within the draft determination. It sought IPART consider reprofiling the water conservation expenditure such that a greater proportion of the funds within

[10] Document 353.1 BOO PR2020 IPART interviews, SWC 2019

the base program expenditure. We note that there may be long term benefits in an enhanced water conservation program which Sydney Water could research, but under the current agreed methodology and licence requirements this is unlikely to be efficient.

The DPIE also commented that it wishes to ensure that funds allocated to Sydney Water for water conservation purposes are spent on that purpose. We note that Sydney Water is required to publish an annual Water Conservation Report which should account for the outputs delivered and related expenditures made.

3.8. Efficient operating expenditure

We summarise our recommended efficient expenditure in Table 3-6 below. This includes revisions to specific operating expenditure adjustments and the revised efficiency challenge which we summarise in Section 3.

Table 3-6 - Summary of efficient operating expenditure

SYDNEY WATER TOTAL OPERATING EXPENDITURE					
($m 2019/20) year ending June	**2021**	**2022**	**2023**	**2024**	**Total 2021 to 2024**
Water	393.2	409.4	410.5	410.1	1623.2
Water BOO	101.0	101.7	101.8	102.4	407.0
Wastewater	482.1	483.2	476.4	474.1	1915.7
Stormwater	14.5	14.8	15.0	15.2	59.5
Recycled Water	33.0	32.9	32.1	32.3	130.2
TOTAL CORE OPERATING EXPENDITURE (including base efficiencies)					
Total including base efficiencies	1023.8	1042.0	1035.8	1034.1	4135.6
Base efficiencies by Sydney Water	20.0	18.2	31.5	34.8	104.5
Total excluding SWC efficiencies	1043.8	1060.2	1067.3	1068.9	4240.1
SCOPE ADJUSTMENTS					
Prospect Macarthur pipeline	0.00	-6.13	-9.42	-10.03	-25.57
Water reactive	-8.40	-10.30	-11.11	-12.01	-41.82
Wastewater reactive/ environmental program	0.00	0.00	0.00	0.00	0.00
BOO water treatment - volume	-0.24	-0.27	-0.29	-0.31	-1.11
BOO water treatment - treatment	-3.30	-3.30	0.00	0.00	-6.60
Electricity	0.00	0.00	0.00	0.00	0.00
City Planning	0.00	0.00	-8.00	-8.00	-16.00
Water conservation (to cost pass through)	-5.00	-5.00	-5.00	-5.00	-20.00
Infrastructure resilience	-2.00	-2.00	-2.00	-2.00	-8.00
Total change in scope	-18.94	-27.01	-35.81	-37.34	-119.11
EFFICIENCY ADJUSTMENTS					
Catchup efficiency	0.00	0.00	0.00	0.00	0.00
Continuing efficiency - Frontier Shift	0.00	-8.12	-15.90	-23.72	-47.74
OTHER ADJUSTMENTS					
Water – value of leakage above ELL	-8.09	-8.09	-8.09	-8.09	-32.35
Total adjustments	-8.09	-16.21	-23.99	-31.81	-80.09
SYDNEY WATER PROPOSED EFFICIENCY CHALLENGE					
Business-wide efficiency gain	-5.10	-15.70	-26.10	-42.00	-88.90
EFFICIENT BASE OPERATING EXPENDITURE					
Water	369.71	374.65	368.62	363.59	1476.57
Water BOO	97.50	97.38	99.94	99.75	394.57
Wastewater	482.09	479.42	461.06	455.20	1877.77
Stormwater	14.47	14.71	14.77	14.90	58.84
Recycled Water	32.96	32.60	31.60	31.52	128.68
Total base opex	996.73	998.76	975.98	964.96	3936.44
BULK WATER					
WNSW Bulk supply	189.18	193.73	199.58	202.78	785.27
SDP	180.62	178.81	178.81	178.81	717.05
TOTAL EFFICIENT EXPENDITURE					
Total	1366.54	1371.30	1354.37	1346.56	5438.77

4. Capital expenditure

4.1. Revised capital expenditure recommendations

In its November 2019 submission Sydney Water proposed capital expenditure of $5087m between 2021 and 2024. In our Final Report we proposed a reducing total capital expenditure by $935m of $4151m (post efficiency). This consists of both proposed increases and decreases in expenditure across various projects and programs In its response to IPART's Draft Determination Sydney Water contested the majority of our recommended adjustment where reductions are proposed. Below we comment in turn on each of these capital expenditure projects and programs and provide our revised view on proposed efficient expenditure for the 2020 determination period.

4.1.1. Prospect to Macarthur Link

Inclusion of the scheme in the November 2019 Updated Submission

In its November 2019 Updated Submission, Sydney Water proposed additional expenditure of $560.9M capex (of which $484.2M in the 2020 Determination Period) and $39M opex for the Prospect to Macarthur Link (ProMac). This expenditure was in addition to approximately $142.5m for assets which was already included in Sydney Water's submission as part of a growth servicing solution.

The drivers Sydney Water outlined for the scheme were related to drought management and resilience, as follows[11]:

- The areas supplied by the southern dams are at risk of water supply disruption due to the ongoing drought.
- The Prospect to Macarthur link will mitigate water supply risks caused by the current drought.
- As it is a two-way link and provides a system balancing capability it also improves system resilience over the long term.

The scheme had been selected by the drought options study undertaken by Sydney Water and WaterNSW. We noted in our Final Report:

> "The drought options study does not incorporate sophisticated economic optimisation or set out a clear process of options identification and evaluation. However, our view is that the first tranche of interventions is nonetheless reasonably sensible and robust."

This was in the context that the drought options study projected potential supply shortfalls and therefore the schemes with the shortest lead time were likely to be prudent to avoid major supply issues and defer very significant new investment.

The scheme proposed by Sydney Water in its November 2019 submission involved two 'fronts' to be delivered in two stages. The western link was scheduled for completion in 2021 and the eastern link was planned for late 2023.

In our review of the November 2019 Updated Submission, we found that the options appraisal process carried out for the project was weak, stating:

> "The Options Appraisal conducted by SWC carried out 'fatal flaw' shortlisting but only for a small number of alternative solutions to address different sections of the link. The fatal flaw shortlisting resulted in one or two options for all sections of the link. Multicriteria analysis was then used to score these options and select a preferred solution.
>
> The options appraisal did not examine alternative strategic solutions."

We found that Sydney Water had not made a strong case that the eastern front was prudent. It was primarily driven by future growth expectations. We recommended an adjustment ($62M in the 2020 Determination Period) to the proposed capex to remove the eastern front expenditure and reprofile the western front spend.

[11] Update to 1 July Price Proposal, 12 November 2019, Sydney Water

February 2020 rainfall

In February 2020, the Greater Sydney area experienced exceptional rainfall. This led to the Greater Sydney dam levels recovering from just over 40% to over 80% of capacity by 17 February 2020.

In an Addendum to our Final Report, we concluded that it was no longer prudent to assume ProMac should proceed in the 2020 Determination Period. This was because:

1. Total reservoir storage was significantly in excess of (more than double) the construction trigger set out in the drought options study. Storage in the Upper Nepean dams, the main urgent driver for constructing the link, was at high levels.
2. As we noted in our Final Report, the drought options study does not incorporate sophisticated economic optimisation or set out a clear process of options identification and evaluation. Deferring this scheme allows time for a more sophisticated drought response and long-term supply-demand plan to be developed, which may identify more cost effective or robust solutions.
3. There are benefits to customer bills of deferring construction closer to the time the scheme is likely to be required.

We recommended a robust Long-Term Integrated Drought Management Plan be developed so that future decisions before and during droughts are soundly based. The plan would need to incorporate a clear process of options identification and evaluation, a clear rationale for any constraints applied, and; apply stochastic techniques and real options analysis, or similar.

Sydney Water Response to the Draft Determination

In its response document, Sydney Water makes the case that $453 million should be included over 2020-24 to cater for new customer demand (growth) and improve system resilience, stating that:

> [excluding the expenditure] "does not recognise that a large proportion of ProMac is required for growth which is occurring now. Without investment, even small increments in demand will place strain on our ability to service customers. For example, in some areas we currently run reservoirs below reserve service levels in high demand periods; other areas are experiencing pressure issues. Parts of the investment related to near-term growth issues have already moved into the delivery phase. Growth-driven investment accounts for $205m of the $453m of funding we ask IPART to reinstate in our plan.
>
> In addition, the recent drought revealed that the southern dams are more exposed to rapid dam depletion than others serving the Sydney region, particularly as that supply area grows. Aggregate dam levels do not provide a reliable guide to local levels of water security. As the city expands to the south west, we should now capitalise on the planning that has been completed and proceed with the full ProMac investment. This will reduce risk from water supply outages and from a potential return to drought for the region, which includes the Western Sydney Aerotropolis."

Sydney Water provides the following breakdown of expenditure by growth and resilience elements:

Table 4-1 - Growth And Resilience Elements

$m 2019-20 year ending:	2020	2021	2022	2023	2024	2025	Total capex	Spend in 2020-24	Spend in 2020-25
'Growth' portion	44.8	199.2	5.5	~	~	~	249.4	204.7	204.7
Resilience	0	59.2	77.1	75.5	36.3	~	248.1	248.1	248.1
Total	45.0	258.0	83.0	75.0	36.0	~	497.5	452.7	452.7

Source: Table in Sydney Water document "SUPP Atkins Fact and Confid Check_SW response" June 2020.

Review and conclusions

The justification for expenditure on the scheme has evolved significantly in the months since the July 2019 submission:

- July 2019: $142.5M required to service growth;
- November 2019: additional $560.9M for drought/resilience[12] increases cost to $703.4M;
- February 2020: heavy rainfall relieves immediate drought pressure;
- April 2020: revised total of $640.5M is required[13]. Of this total, 61% is to service growth and 39% is for resilience[14].

Economic analysis of the scheme commissioned by Sydney Water[15] found that, taking account of the probability of different drought scenarios, the delivery of the scheme would not be cost-beneficial. It found that it would result in a net cost of $33.3 million in NPV terms with an expected BCR of 0.8, i.e. benefits which are only 80% of the costs. The benefits were only found to outweigh the costs in two of the ten sensitivity tests carried out, and even then by only $2M or $7M in NPV terms.

The Board Paper providing Delivery Approval for Stage 1 (Western Front)[16], prepared before the February 2020 rainfall event, noted that some of the scope could be deferred and it would become a pure growth scheme if reservoir storage were to recover.

We consider that Sydney Water has not provided justification for proceeding with the resilience elements of the scheme. Indeed, the evidence provided suggests that it would not be cost-beneficial to do so. We therefore cannot recommend including the resilience expenditure in the 2020 Determination Period. Deferral will provide opportunity for the robust Long-Term Integrated Drought Management Plan to be developed to ensure effective and cost-beneficial solutions are implemented.

We consider that there is a stronger case for the growth elements of the scheme. Significant development is expected in the areas to be served. However, we note that Sydney Water did not seek to justify the additional capex for immediate growth servicing purposes (as opposed to longer term growth servicing) until after the February 2020 rainfall removed the immediate drought driver. Nonetheless, in the round, we conclude that it is reasonable to carry out significant growth capex in this area and have therefore recommended accepting Sydney Water's proposed growth expenditure.

The recommended adjustment is set out below.

Table 4-2 – Recommended ProMac adjustments

$M 2019/20) year ending June	2020	2021	2022	2023	2024	2025	Total capex	2021-24 Total	2021-25 Total
SWC proposed expenditure (November 19)	76.7	399.5	22.8	62.0		-	560.9	484.2	484.2
Recommended expenditure	45.0	199.0	5.0	~	~	~	250.0	205.0	205.0
Adjustment applied	-31.7	-200.5	-17.8	-62.0			-311.9	-280.2	-280.2

[12] See drivers listed on page 23 of the "Update to 1 July 2019 proposal"
[13] Inferred from initial $142.5M in the July 19 submission and the additional $498.0M detailed in Sydney Water's response to the Draft Determination
[14] i.e. $248.1M resilience is 39% of the total $640.5M requested
[15] ProMac Economic Analysis: Cost Benefit Analysis – Draft Report, Jacobs, January 2020
[16] Sydney Water "Board meeting of 4 February 2020"

4.1.2. Growth

Efficient Expenditure in IPART Draft Report

Rates of new development in the 2016-20 Determination Period were at unprecedented levels. In its July 2019 submission[17], Sydney Water set out a number of reasons why development in the 2020 Determination Period was expected to be lower than current levels. These reasons include declining dwelling approvals and housing-related lending.

Sydney Water requested significant increases in growth expenditure for water and wastewater compared to the historically high levels of expenditure in the current Determination Period.

- For water:
  - incorporating ProMac, the proposed 2021-24 water growth expenditure would constitute a 108% increase in average water growth expenditure.
  - excluding ProMac, the proposed expenditure would be 19% higher than in the current period.
- For wastewater: the total proposed 2021-24 expenditure would constitute a 70% increase in average wastewater growth expenditure.

Our review supported higher growth capex in the next Determination Period. Even without ProMac, we recommended pre-efficiency water and wastewater growth expenditure that was 42% higher than in the current period, averaging $358.3M p.a.

We noted that Sydney Water had applied a number of reductions to the investments emerging from its growth planning processes. However, we found that, "the mechanisms used to apply these challenges and the urgency of timing, project scope and basis of cost estimate that the challenges have been applied to is not always clear."

We found that the Growth Servicing Investment Plans which are the source of some of the costs were considered by Sydney Water to be first cuts and "not highly optimised" with very high contingency allowances, suggesting a low level of confidence in scope and cost estimation.

We found that we had not been given a compelling justification for the scale of increase requested. We therefore recommended a general adjustment to proposed water and wastewater growth expenditure, except for major projects, to match the average expenditure in the 2016-20 period. We identified and separated out all major (>$100M capex non-bucket code) projects from this adjustment as a number of them have been reviewed in their own right and found to be prudent or subject to specific adjustments.

This resulted in reductions against Sydney Water's proposed increases of $55.9M for water and $180.2M for wastewater. The total growth expenditure we recommended was still significantly higher than in the current Determination Period because of these major projects. Major projects not affected by the general cost reduction included Riverstone STP Amplification, West Camden WWTP - Biosolids Upgrade and Amplification, Lowes Creek WWTP Stage 1, Northwest Treatment Hub - Rouse Hill, South Creek WWTP Stage 1[18] and ProMac discussed above.

Sydney Water Response to the Draft Determination

In its response to IPART's Draft Determination, Sydney Water requested that IPART reinstate $236M of growth expenditure, making the case that greater greenfield and commercial development will lead to higher costs per connection and that infrastructure development in Western Sydney will be a key driver for expenditure:

> "there are multiple drivers of cost for growth expenditure, including the number, location and type of new sources of demand (not just residential properties, but also new business and industry) and the capacity of existing networks in that location. Dwelling forecast growth data demonstrates that a higher proportion of new dwellings will be in greenfield areas over 2020-24 than in 2016-20.23 There are significant commercial developments planned in greenfield areas in Western Sydney, including the Aerotropolis.
>
> In greenfield areas, we often need to spend on a combination of land costs, reservoirs, trunk mains and pumping stations to supply new properties with water. This is on top of the usual cost that we need to invest in to supply new properties in infill areas. The situation for new wastewater connections is

[17] Attachment 8: Water Demand and Customer Numbers, July 2019
[18] Project names as per Sydney Water spreadsheet "SIR Capex 2 – Nov 19"

analogous. This means the costs of growth in greenfield areas are a multiple of the costs to supply infill areas.

Our growth funding request is already based on a conservative view of the likely costs. The NSW Government has indicated a strong commitment to growth in Western Sydney. The expected slowdown in the economy in 2020 is only likely to reinforce this commitment, with recent signals that infrastructure development in Western Sydney will be used as a key catalyst for economic stimulus in response to the pandemic."

Sydney Water explains that it expects greenfield development to make up a greater proportion of dwelling growth in the 2020 determination period. It states that servicing greenfield growth "on a 'cost per property' basis [..] can still be many times higher than for infill."

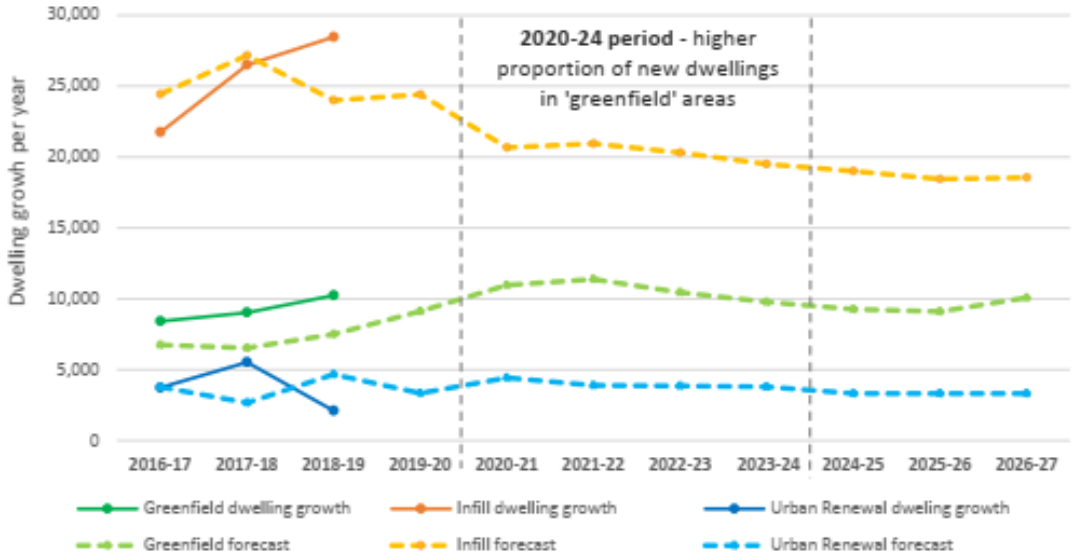


Figure 4-1 Dwelling growth in Sydney Region

Source: Figure 3-3 of Sydney Waters Response to Draft Determination, itself based on Housing Supply Forecast Model (HSFM) 2016.

COVID19

The Business Impacts of COVID-19 Survey carried out by the ABS in April 2020[19] found that most businesses expected reduced cash flow (72%) and reduced demand for goods and services (69%) to have an adverse impact on them over the next two months. This was even higher for the construction sector where 77% of businesses expected reduced cashflow.

Residential development activity has been adversely affected in previous economic downturns, albeit followed by a recovery as shown below:

[19] 5676.0.55.003 - Business Indicators, Business Impacts of COVID-19, April 2020, ABS (https://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/5676.0.55.003Main%20Features3April%202020?opendocument&tabname=Summary&prodno=5676.0.55.003&issue=April%202020&num=&view=)

Figure 4-2 Greater Sydney Region Dwelling Approvals and Completions

Source: Greater Sydney, Central Coast, Illawarra and Greater Newcastle Regions Local Government Area Housing Activity, Department of Planning and Environment, Housing and Population Insights

In its Response to the Draft Determination, Sydney Water has projected COVID19 may lead to 0.2% to 2.4% fewer total water customers (compared to non-COVID19 projections) by 2023-24[20].

NSW Government has announced measures to encourage development to continue through the Planning System Acceleration Program[21]. Measures this program envisages include:

- Fast-tracking of assessments of State Significant Developments, development applications (DAs) and rezoning.
- Support to councils and planning panels to fast-track locally and regionally significant DAs.
- Investment of $70 million to co-fund vital new community infrastructure in North West Sydney (Blacktown and The Hills Local Government Areas) including roads, drainage and public parks to unlock plans for the construction of new houses.

Many other broader measures have also been rolled out to support the economy, such as the Reserve Bank of Australia's Term Funding Facility which is designed to support lending to businesses.

Review and conclusions

We recognise that growth expenditure is inherently uncertain and will necessarily continue to evolve over time, affected as it is by government decisions, demographic and economic changes, the housing, commercial development and financial markets, and infrastructure co-dependences. COVID19 adds further uncertainty to this.

We consider it is reasonable to assume that greenfield growth will form a higher proportion of growth in future and that it is likely that servicing greenfield development will entail higher initial unit costs than servicing infill.

[20] Table 17-7 of Sydney Water's Response to Draft Determination
[21] See https://www.planning.nsw.gov.au/Policy-and-Legislation/COVID19-response/Planning-System-Acceleration-Program

During interviews in April 2020 we asked for outturn unit costs for servicing greenfield growth. We infer from the responses given and the lack of this detail in its submissions, that Sydney Water does not routinely keep track of outturn costs against key cost drivers (e.g. per hectare, per volume of final planned demand, per final number of planned connections). The costs provided were a mixture of water and wastewater servicing costs with "dwellings completed" the only denominator.

We have limited confidence in Sydney Water's aggregate growth expenditure projections. This is because they are built on the "bottom-up" collation of cost estimates for schemes which are inherently uncertain as location, timing and nature of development change over time. This is little top-down justification of the total amount of expenditure against key drivers of spend.

Given the scale of growth expenditure and uncertainty in the precise timing, nature and location of future development, we consider that robust top-down justification of future expenditure is necessary. In future, we recommend that Sydney Water report on historical outturn costs against key cost drivers such as hectares, final or demand connections serviced and use this to demonstrate that aggregate proposed expenditure is justified.

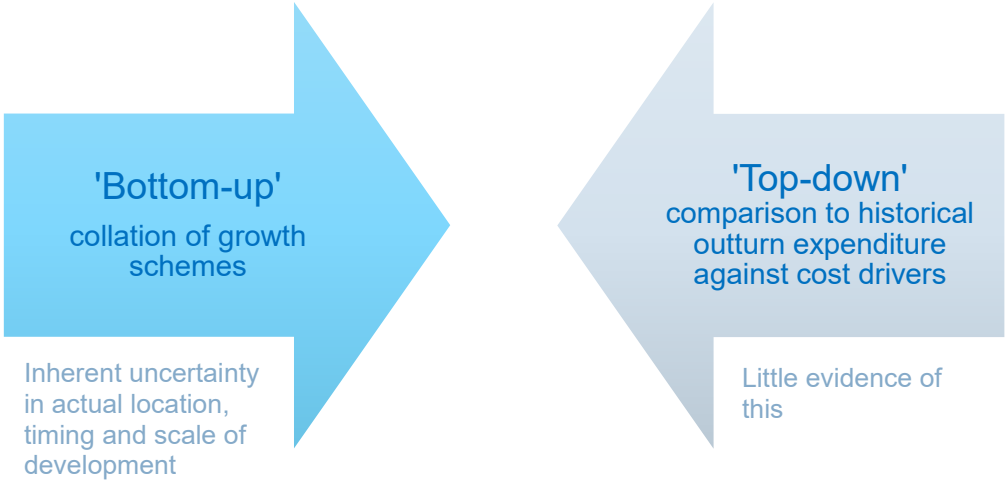


Figure 4-3 Bottom-up and top-down approaches

It is possible that COVID 19 will have an impact on growth. However, this may be the mitigated by measures such as the Planning System Acceleration Program set out above and countervailing effects summarised in the Demand section below (e.g. potential onshoring, increases in growth projections since the July 2019 submission and rezoning of a number of precincts for development).

Overall Sydney Water is asking for an increase in what we have termed 'general' growth capex (i.e. excluding major projects) of 19% per annum for water and 25% for wastewater compared to the current Determination period.

We consider it likely that efficient 'general' growth expenditure will be higher than in the current period because of higher rates of greenfield development with greater initial unit cost to service. However, as outlined above, we do not consider that Sydney Water has robustly justified the level of increase it has asked for. In particular, we consider that higher level analysis and presentation of key outturn cost drivers is required for such a significant increase in expenditure.

In considering what level of expenditure to recommend, we have reviewed the outturn greenfield cost data provided by Sydney Water. However, we do not consider that it is suitable to be applied to derive the overall expenditure level, missing key variables such as final properties, hectares or similar (and in many cases also being unclear whether it relates to water, wastewater or both).

This therefore leaves us with two main sources of information: historical levels of expenditure and Sydney Water's projections. We accept that expenditure levels are likely to be higher than historical levels because of expected increased levels of greenfield development. However, we also find that Sydney Water has not robustly justified the total level of expenditure. Given that historical levels are likely to be an underestimate and Sydney Water's proposals have not been well justified we have recommended a level of expenditure half way between the two sources of information.

This leads to a lower level of adjustment than in our Final Report, in recognition of the information provided by Sydney Water about the expected higher levels of greenfield development.

We summarise below our recommended adjustments:

Table 4-3 – Recommended general growth adjustments

($M 2019/20) year ending June	2021	2022	2023	2024	2025	2021-24 Total	2021-25 Total
Sydney Water proposed general expenditure (November 19)							
Water	65.1	86.6	86.0	66.0	51.9	303.7	355.7
Wastewater	190.5	192.6	232.6	148.0	188.9	763.7	952.6
Adjustments recommended in our Final Report							
Water	-12.0	-15.9	-15.8	-12.1	10.0	-55.9	-45.8
Wastewater	-46.0	-46.5	-56.1	-35.7	-44.0	-180.2	-224.2
General growth expenditure recommended in our Final Report (pre-efficiency)							
Water	53.2	70.7	70.2	53.9	62.0	247.9	309.9
Wastewater	144.6	146.2	176.4	112.3	144.9	579.4	724.3
Revised adjustments							
Water	-6.0	-8.0	-7.9	-6.1	10.0	-27.9	-17.9
Wastewater	-23.0	-21.2	-28.1	-17.9	-22.0	-90.1	-112.1
Revised recommended general growth expenditure (pre-efficiency)							
Water	59.2	78.6	78.1	59.9	62.0	275.8	337.8
Wastewater	167.6	171.4	204.5	130.1	166.9	673.6	840.5

4.1.3. Critical Sewers

Efficient Expenditure in IPART Draft Report

While Sydney Water's performance against the Operating Licence and the EPL limit for total chokes are within limits, performance against the Environmental Protection Licence (EPL) limits for dry weather overflows has failed for seven systems in the last three years and 15 of 23 systems show deteriorating performance.

Although there is a clear need for Sydney Water to act to meet its Operating Licence and EPL limits relating to overflows from the wastewater network, and we accept that there is a strong need for Sydney Water to increase its activities to address this deteriorating performance, we stated in our Final Report that Sydney Water's response is disproportionate to the rate of deterioration and its level of performance with respect to its licence limits. The disproportionate response is evidenced in Sydney Water's proposal to increase both capital and operating expenditure by 118% between the current and forward periods.

As a result of these findings, we made a number of adjustments to Sydney Water's proposed expenditure for its critical sewer assets in our Final Report to IPART.

We recommended that the scope of the 'Overflows to waterways' sub-program be reduced by 10%. This reduction was proposed to

- better match the magnitude of expenditure with the challenge faced by Sydney Water.
- account for potential overlap with the benefits of the concurrent ramp-up in unplanned maintenance.
- moderate the timing of expenditure to a small extent.

This reduction in scope removed a total of $18.8 million from Sydney Water's proposed expenditure.

We also proposed in our Final Report that the program have an 18% efficiency challenge applied as we considered that there was no valid reason for not applying an efficiency challenge to Sydney Water's critical sewers program. The approach being taken by Sydney Water in not applying an efficiency factor to this program was inconsistent with Sydney Water's approach to other programs. In addition, as the Critical Sewers program is in its infancy, we consider that there is scope for greater efficiencies to be realised than in more mature programs.

The 18% efficiency adjustment that was proposed in our Final Report was only applied to the critical sewers and applied after the 10% scope adjustment set out above. The impact of the efficiency adjustment we proposed was to reduce recommended prudent and efficient expenditure by $84 million (although Sydney Water identified a calculation error that overstated this figure). We considered that this efficiency adjustment should not lead to any reduction in the scope for the critical sewers program.

In our Final Report we treated critical and non-critical sewers together. We recommended a scope reduction to the non-critical sewers mains program of $37.1 million over the 2021-2024 period.

Sydney Water submission

In its submission on IPART's Draft Determination, Sydney Water opposed the reductions made to its proposed critical sewers expenditure.

In response to the 10% reduction in scope to the 'Overflows to waterways' sub-program, Sydney Water has noted that although the Pollution Reduction Program (PRP) notices issued by the Environment Protection Authority (EPA) include challenging timetables, the EPA's ongoing assessments of the workplans to meet the PRPs has identified that Sydney Water's current scope may not be adequate. As a result of these reservations, the EPA has asked for Sydney Water to include more work in its program. Therefore, Sydney Water has stated that the 10% scope cut to the 'Overflows to waterways' sub-program cannot be accommodated and the $18.8 million reduction proposed by Atkins-Cardno should be reversed.

With regard to the proposed 18% efficiency reduction, Sydney Water responded that it had made a deliberate decision not to apply an efficiency reduction to its Critical Sewers program as it was considered to be too high a risk in terms of cost and delivery to accommodate. Sydney Water states that it reviewed the Critical Sewers program on the same basis as its other programs when it reviewed the original forecast using a 'top down' approach.

Sydney Water stated that it considered that the forecast costs it included in its submission were "low". We note that this is inconsistent with the basis on which Sydney Water has included costs for other works in its proposal where it sought to include central estimates. Sydney Water has provided to us a number of examples of recent procurements where outturn costs have exceeded that forecast in its submission. Sydney Water states that these are reflective of the wider program. However, there is no quantitative analysis of cost drivers across the program that we have been provided.

Sydney Water also identified in its response to IPART's Draft Determination that even if it agreed that an efficiency reduction was appropriate, actions to improve efficiency are either already built into its forecasts or they cannot practically be actioned. This is because the scope of works for these projects is now much more defined, with design, and even procurement, having been completed in some cases. The four efficiency improvement areas of improved cost estimation/intelligence, delivery and procurement, enhanced program and portfolio management and optimised solutions were all considered to have either limited opportunity or being not possible to apply to the 'Overflows to waterways' sub-program. Where there was limited opportunity to apply efficiencies, Sydney Water considered that they would only be able to be used in later years of the proposed work.

As a result of these factors, Sydney Water considers that it is not appropriate for the 18% efficiency reduction to be applied to its proposed Critical Sewers program.

EPA Submission

The EPA provided a submission on IPART's Draft Determination which included comment on Sydney Water's critical sewers program, wet weather overflows program and reactive maintenance for sewers. While acknowledging the magnitude of the increase in Sydney Water's proposed expenditure and IPART's position in the Draft Determination that efficiency gains could be achieved in this area, the EPA expressed concern that the expenditure reductions would put at risk Sydney Water's ability to achieve compliance. The EPA submission also notes that it will continue to investigate non-compliances and take appropriate regulatory action.

Findings

Since we submitted our Final Report, the EPA has provided formal advice to Sydney Water on the adequacy of its PRPs. In a letter to Sydney Water dated 7 April 2020, the EPA provided comments on Sydney Water's draft project plans for its dry weather overflow abatement pollution reduction program, in particular the proposed projects for the North Head and Cronulla Systems. This formal advice confirmed that the EPA consider that although Sydney Water's draft plans present a generally sound approach to dry weather overflow abatement, the EPA's view is that further work is required by Sydney Water in order to achieve the objectives of the PRP, meet the Environmental Protection Licence (EPL) requirements for the content of the plans, and to improve the clarity, transparency and effectiveness of the plans.

The EPA has particular concerns related to the proposals for the Cronulla system and considers that the draft plan does not achieve the objectives and requirements of the PRP required by the EPL conditions. The EPA considers that the predicted non-compliances after 30 June 2021 unless wetter conditions return is unacceptable, as there is no guarantee that this will happen and this should not be relied on to achieve and maintain compliance. As a result, the EPA has requested that Sydney Water alter its plan and proposed work to ensure the required compliance is achieved by 30 June 2021 and maintained thereafter.

In addition, the EPA has identified concerns related to the 'once off' maintenance inspection program proposed by Sydney Water to inform the works to be undertaken to achieve the reduction of dry weather overflows to waterways that underpin the draft project plans. The EPA has stated that it is concerned that Sydney Water has not committed to undertaking a continuous program to target chokes and maintain compliance as required under the licence conditions. We do not share this concern for the reason that well designed, targeted inspection programs can be more cost effective than rolling program. But we have noted that Sydney Water's critical sewers program is a very large increase on historic levels over a short period of time.

The EPA has requested that, where possible, Sydney Water provides further details to clarify and quantify its role in achieving the objectives and requirements of the PRP. The EPA has also requested that Sydney Water must ensure sufficient contingencies are developed and implemented where there are uncertainties associated with using its new and innovative approaches to achieving the objectives and requirement of the PRP to ensure a return to compliance by the required timeframe.

Based on the formal advice provided by the EPA to Sydney Water and the directions that have been given, we consider that there is less ability for Sydney Water to introduce any scope reductions to its Overflows to waterways' sub-program than we had originally proposed. Therefore, we recommend that the 10% scope reduction that we had included in our Final Report to IPART be reversed. This reversal of the scope reduction should provide further assurance to the concern expressed by the EPA regarding the sufficiency of funding for Sydney Water in this area.

We consider that an efficiency adjustment for the critical sewers program is still appropriate. While Sydney Water has identified in its submission to the Draft Determination a number of reasons that constrain its ability to achieve efficiencies in a short period of time before the nominated compliance dates, the reality is that the EPA's stance regarding compliance, and the need for Sydney Water to act are not new developments. While we recognise that Sydney Water has accepted risk in this area, this has not precluded Sydney Water from planning for and optimising its asset management strategies before this point in time. The critical sewers program also lends itself to a strong program management approach with close tracking of benefits and continual improvement and continual adjustment to better information on costs and benefits as work is undertaken. This is not evident in the work done in developing the program although we acknowledge that the program is supported by substantial and

detailed bottom-up analysis on needs. We expect that the largest efficiencies will be gained through optimising the interventions based on feedback received in execution of the program to meet the EPA's expectations.

We also note that Sydney Water will substantially increase its proactive maintenance program in the 2020 period which will also provide benefit in meeting the EPA's expectations and will help Sydney Water provide a balanced response to achieving its licence requirements.

We recommend that an efficiency challenge of 18% is still applied to this program. The use of an average efficiency is not to detract from the program specific work that Sydney Water has undertaken in arriving at its efficiency challenges. It is only to identify an estimate of the efficiencies that Sydney Water consider achievable from the capabilities at its disposal. As noted in the Final Report, this efficiency adjustment is not to diminish the importance of the compliance risk, it is only to acknowledge the potential for delivery efficiencies in achieving compliance.

However, acknowledging the scale of the short-term task in front of Sydney Water, was have not applied this efficiency in the first two years of the 2020 period; it is applied from year three onwards.

We note that as we have no longer proposed a scope adjustment to the critical sewers program, the output measure in this area should reflect those originally proposed by Sydney Water.

Impact on expenditure proposals
Our recommended efficiency expenditure for critical and non-critical sewers is detailed in Table 4-4.

Table 4-4 Recommended non-critical and critical sewer expenditure

($k 2019/20) year ending June	2021	2022	2023	2024	2025	Total 2021-2024	Total 2021-2025
Sydney Water Submission (November 19)	131,394	141,614	130,401	129,366	64,919	532,775	597,694
IPART Draft Determination (March 2020)	97,961	106,735	97,924	97,450	58,215	400,069	458,284
Atkins adjustment (May 2020)	(9,978)	(9,498)	(27,049)	(26,488)	(13,116)	(73,013)	(86,128)
Atkins recommended expenditure	121,416	132,116	103,352	102,878	51,803	459,762	511,566

4.1.4. Wet Weather Overflow Abatement Program

Efficient Expenditure in IPART Draft Report
Sydney Water and the Environmental Protection Authority (EPA) are in agreement that addressing wet weather overflow risk through source control presents good value for money to the community and can drive significant environmental improvement over large geographic areas. This will be the focus of the 2020-24 period across three priority catchments. After Sydney Water had submitted its July 2019 pricing proposal, the EPA has outlined their intent to impose a more stringent improvement level which would require additional funding and source control work to occur across five catchments, instead of three.

Sydney Water proposed total expenditure of $172 million in its July 2019 pricing proposal which was based on an internally approved business case finalised in June 2019. At the time of the June submission three priority catchments were identified with source control projects chosen as the primary focus of abatement. These projects corresponded to 40 EPA credit points for investment which manages environmental impact through an offset regime. These projects involve $141 million expenditure out of the total $172 million ($31 million is for other wet weather overflow abatement activities). Subsequent to submitting its July 2019 pricing proposal and following further discussions with the EPA, it was mandated that Sydney Water are required to achieve 60 credit points within the 2020-24 regulatory period.

In its November update to its pricing proposal, Sydney Water detailed that an additional $52 million of capital expenditure would be required to achieve the additional 20 credit points. We reviewed the cost and benefit 'credit points' of the 40 point and 60 point programs. In our Final Report[22] we challenged Sydney Water regarding the decreasing marginal cost of addressing the wet weather overflows – the additional 20 points are only three-quarters of the cost of the first 40 points, ($2.6 million per point compared with $3.5 million per point). The implication is that the initially proposed 40 point program is less value for money than the revised program 60 point. Sydney Water responded that the 40 point program was focused on larger catchments which were prioritised because of their size. Initial work has since provided better estimates of the costs of abatement works which has led to the estimates of the revised program. Notwithstanding the above evaluation of the marginal incremental costs of achieving additional credit points, we also considered that the original program of work based on 40 points was not challenged from an efficiency perspective by Sydney Water. The building block component projects of the program were not finalised at the time of our initial review.

At the time of our initial review Sydney Water appeared to be on the back foot in terms of planning and procurement for the projects so we considered there to be program efficiencies to be made once a more detailed procurement strategy had been developed. We therefore made a program level efficiency adjustment of 18% to bring the efficiency challenge in line with other programs we had seen that Sydney Water had internally challenged themselves

Sydney Water Submission
Sydney Water's Response to IPART's Draft Report and Determination[23] states that:

- the reduction could lead to unacceptable environmental performance or an overspend to attain compliance
- there is no scope flexibility
- the program is not "on the back foot"
- the link between future efficiencies and different program component marginal costs is baseless
- the program was challenged during the internal efficiency assessment – it was just clear that cost uncertainty meant that a reduction was not prudent, and;
- there is very little scope for applying an 18% efficiency reduction at this stage of planning.

EPA Submission
As noted, The EPA provided a submission on IPART's Draft Determination which included comment on Sydney Water's critical sewers program, wet weather overflows program and reactive maintenance for sewers. While acknowledging the magnitude of the increase in Sydney Water's proposed expenditure and IPART's position in the Draft Determination that efficiency gains could be achieved in this area, the EPA expressed concern that the expenditure reductions would put at risk Sydney Water's ability to achieve the required 60 points of abatement. The EPA submission notes that if Sydney Water does not achieve the required level of abatement it will be in breach of its environmental protection licences. The EPA notes that it will continue to investigate non-compliances and take appropriate regulatory action. As explained in more detail below we have now moderated our efficiency challenge which does not alter any of the expectations to deliver on the EPA obligations.

Review
In March 2020 the EPA issued EPL licence variations for Sydney Water's four large coastal sewage treatment systems (Malabar, Bondi, North Head and Cronulla) which provided the legal obligation to complete the Wet Weather Overflow Pollution Reduction Program (no. 307.1) by 30 June 2024. In parallel the EPA issued prescriptive guidance for the Wet Weather Overflow Abatement regulatory measure. This guidance prescribes how Sydney Water should achieve its 60 credit points. High risk sites are the focus of the program and must

[22] Atkins Final Sydney Water Expenditure and Demand Review Report, February 2020
[23] Sydney Water's Response to IPART's Draft Report and Determination

make up the majority (70%) of the regulatory points. Some regulatory points are available for medium risk sites with no points available for low risk sites.

The first phase of the Upper Parramatta River Catchment project delivery is underway and costs have so far been in line with forecasts. The project is forecast to outturn at 5% less than was in the delivery approval business case . Detailed design work has been completed for Mid Parramatta and Lane Cove project with detailed design for the Prospect and Middle Harbour catchments due to commence soon. The Delivery Approval Business Cases (DABC) are due in July 2020.

Findings

Based on the additional documentation provided and progress of the program overall we consider that the extent of our previous efficiency challenge should now be moderated for the early years of the period with a program level catch-up efficiency challenge maintained for the latter years of the period. This recognises the advancement of projects and the urgency to progress with delivery as soon as possible to meet the obligations set by the EPA and referred to by the EPA in its submission. However we consider that customers should not bare all of the delivery risk in the additional expenditure requirements to meet the EPA timelines. We consider that there is opportunity for Sydney Water to take on more cost risk than they are indicating within their submission and response; one which maintains an incentive to innovate, challenge cost estimates and optimise the management of the program over the period, particularly in the last two years when the delivery approach will be embedded. For the avoidance of doubt we are proposing a specific program level catch up efficiency challenge which does not alter any of the expectations to deliver on the EPA obligations.

Impact on expenditure proposals

The impact of the changes on the recommended expenditure profile is shown in Table 4-5 below.

Table 4-5 - Wet Weather Overflow Abatement program recommended expenditure

Expenditure $k	2021	2022	2023	2024	Total 21-24
Sydney Water Submission (Nov-19)	51,004	59,712	60,715	52,669	224,100
IPART Draft Determination (Mar-20)	41,823	48,964	49,786	43,188	183,762
Atkins recommended catch-up efficiency adjustment	~	~	(10,929)	(9,480)	(20,409)
Atkins recommended catch-up efficiency adjustment (%)	~	~	(18.0%)	(18.0%)	(9.1%)
Atkins recommended expenditure (May-20)	51,004	59,712	49,786	43,188	203,691

4.1.5. Other renewals programs

Sydney Water have opposed our recommended expenditure for three renewals programs: Stormwater, Reservoirs and Wastewater Treatment Plants. Sydney Water are proposing record levels of expenditure across each of these three programs of work. We are generally supportive of the proposed increases. When we submitted our Draft Report we broadly identified that proposed expenditure was not readily linked to asset performance. Sydney Water provided some additional information to us throughout this period to inform recommendations in our Final Report. The table below highlights the relative increases in expenditure sought by Sydney Water for the 2020 compared to the 2016 Determination Period.

Table 4-6 - Increases in Expenditure ($000k 19/20)

Asset Class	2016 Determination Period Actual Expenditure (17-20)	Sydney Water Proposed Expenditure 2020 Period (21-24)	Sydney Water Proposed % Increase in expenditure 2020 period (21-24)	Atkins Recommended Expenditure	Atkins Recommended % increase in expenditure in 2020 period relative to 2016 period (21-24)
Stormwater Renewals	58,722	138,249	135%	122,461	109%
Reservoir Renewals (excl. Potts Hill)	71,900	101,243	41%	84,325	17%
Wastewater Treatment Plant Renewals	513,307	532,104	4%	527,407	3%

The reductions we recommended to these programs were much higher in our Draft Report. We reviewed additional information provided and increased our recommended expenditure. There has been no additional information provided within Sydney Water's response to IPART's Draft Determination on these programs. Proposed expenditure in these areas is at record levels and there has been no new asset performance or condition information provided for us to adjust our recommended expenditure any further. Additionally there are some similar projects that we have ringfenced outside of this expenditure e.g. Potts Hill reservoir renewal.

Sydney Water have also not mentioned within their response that we have proposed increased expenditure allowances (over and above that proposed by Sydney Water) for renewals works at Quaker's Hill and St Mary's WWTP as well as additional expenditure for civil works surveys on wastewater pumping stations which they appear to have accepted. We also proposed bringing forward expenditure on Waterways Health in line with Sydney Water's outcomes of customer engagement. This reinforces our overall approach that we recommend an envelope of expenditure, we do not 'approve' projects as we propose increases and decreases in scope across various project line items across the capital program.

4.1.6. Other

Miscoding of SGO107 SWPGA-SW
In its Response document, Sydney Water states "We suspect that in their Final Report, Atkins has miscoded the SGO107 SWPGA-SW program under wastewater."

We have based our analysis on Sydney Water's November 2019 submission in which we believe this issue was resolved. Indeed, we even apply a $2.6M adjustment to water service capex in 2020 related to this scheme[24].

Green Square HAF
In its Response document Sydney Water states "in Atkins Final Report, Atkins has not removed the $7 million deduction to the Green Square HAF" .
We have reversed this reduction out within our capex tables below.

[24] See section 6.4.2.1 of our Final Report

4.2. Efficient capital expenditure by service: 2016 determination period

In the below tables we present our recommended efficient capital expenditure for the 2016 determination period.

4.2.1. Water

Table 4-7 – Water capital expenditure – 2016 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - WATER SERVICE					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	128.6	117.3	99.4	130.8	476.1
New mandatory standards	0.0	0.2	0.0	0.0	0.2
Discretionary standards	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	63.8	43.0	93.9	108.2	308.9
Government programs	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.1	2.3	1.6	0.0	3.9
Total	192.5	162.9	194.9	239.0	789.2
Atkins/Cardno recommended scope/ other adjustments for specific programs or projects					
SGO107 SWPGA				-2.6	-2.6
Prospect to Macarthur adjustment				-31.7	-31.7
Sub-total scope/other adjustments	***0.0***	***0.0***	***0.0***	***-34.3***	***-34.3***
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	128.6	117.3	99.4	121.3	466.6
New mandatory standards	0.0	0.2	0.0	0.0	0.2
Discretionary standards	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	63.8	43.0	93.9	83.4	284.2
Government programs	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.1	2.3	1.6	0.0	3.9
Total Efficient Expenditure	192.5	162.9	194.9	204.7	754.9

4.2.2. Wastewater

Table 4-8 – Wastewater capital expenditure – 2016 determination period

SYDNEY PROPOSAL - CAPEX - WASTEWATER SERVICE					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	187.6	216.5	281.7	242.5	928.2
New mandatory standards	15.2	53.0	46.0	46.5	160.7
Discretionary standards	0.0	0.4	0.9	0.0	1.3
Growth - funded by other	123.8	203.7	172.4	257.8	757.6
Government programs	5.6	0.2	0.1	0.0	5.9
Business efficiency	3.1	1.9	1.0	4.2	10.3
Total	335.4	475.8	502.0	550.9	1864.1
Atkins/Cardno recommended scope/ other adjustments for specific programs or projects					
Upper South Creek Expenditure				-2.7	-2.7
Sub-total scope/other adjustments	***0.0***	***0.0***	***0.0***	***-2.7***	***-2.7***
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	187.6	216.5	281.7	242.5	928.2
New mandatory standards	15.2	53.0	46.0	46.5	160.7
Discretionary standards	0.0	0.4	0.9	0.0	1.3
Growth - funded by other	123.8	203.7	172.4	255.1	754.9
Government programs	5.6	0.2	0.1	0.0	5.9
Business efficiency	3.1	1.9	1.0	4.2	10.3
Total Efficient Expenditure	335.4	475.8	502.0	548.2	1861.4

4.2.3. Stormwater

Table 4-9 – Stormwater capital expenditure – 2016 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - STORMWATER					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	15.6	18.9	13.3	17.8	65.6
New mandatory standards	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	7.4	20.5	9.4	1.1	38.3
Government programs	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0
Total	23.1	39.4	22.7	18.9	104.0
Atkins/Cardno recommended adjustments for specific programs or projects					0
Sub-total scope/other adjustments	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	15.6	18.9	13.3	17.8	65.6
New mandatory standards	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	7.4	20.5	9.4	1.1	38.3
Government programs	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0
Total Efficient Expenditure	23.1	39.4	22.7	18.9	104.0

4.2.4. Corporate

Table 4-10 – Corporate capital expenditure – 2016 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - CORPORATE					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	59.9	103.5	104.5	82.2	350.1
New mandatory standards	1.0	5.2	3.1	1.5	10.9
Discretionary standards	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	0.0	0.0	0.0	0.0	0.0
Government programs	0.0	0.0	0.0	0.0	0.0
Business efficiency	26.8	39.5	26.6	38.7	131.6
Total	87.7	148.3	134.2	122.4	492.6
Atkins/Cardno recommended adjustments for specific programs or projects					
BxP Imprudency Adjustment	-5.2	-5.2	-4.3	0.0	-14.7
Sub-total scope/other adjustments	***-5.2***	***-5.2***	***-4.3***	***0.0***	***-14.7***
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Existing mandatory standards	57.3	100.9	102.3	82.2	342.7
New mandatory standards	1.0	5.2	3.1	1.5	10.9
Discretionary standards	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	0.0	0.0	0.0	0.0	0.0
Government programs	0.0	0.0	0.0	0.0	0.0
Business efficiency	24.2	36.9	24.5	38.7	124.2
Total Efficient Expenditure	82.5	143.1	129.9	122.4	477.9

4.2.5. Total capital expenditure

Table 4-11 – Total capital expenditure – 2016 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - TOTAL PROGRAM					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Water	192.5	162.9	194.9	239.0	789.2
Wastewater	335.4	475.8	502.0	550.9	1864.1
Stormwater	23.1	39.4	22.7	18.9	104.0
Corporate	87.7	148.3	134.2	122.4	492.6
Total	638.6	826.3	853.8	931.2	3249.8
Atkins/Cardno recommended adjustments for specific programs or projects					0
SGO107 SWPGA	0	0	0	-2.6	-2.6
Prospect to Macarthur adjustment	0	0	0	-31.7	-31.7
Upper South Creek Expenditure				-2.7	-2.7
BxP Imprudency Adjustment	-5.2	-5.2	-4.3	0.0	-14.7
Sub-total scope/other adjustments	***-5.2***	***-5.2***	***-4.3***	***-37.0***	***-51.7***
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE					
($M 2019/20) year ending June	2017	2018	2019	2020	**2017-20 Total**
Water	192.5	162.9	194.9	204.7	754.9
Wastewater	335.4	475.8	502.0	548.2	1861.4
Stormwater	23.1	39.4	22.7	18.9	104.0
Corporate	82.5	143.1	129.9	122.4	477.9
Total Efficient Expenditure	633.4	821.1	849.5	894.2	3198.1

4.3. Efficient capital expenditure by service: 2020 determination period

In the below tables we present our recommended efficient capital expenditure for the 2020 determination period.

4.3.1. Water

Table 4-12 – Water capital expenditure – 2020 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - WATER SERVICE							
($M 2019/20) year ending June	**2021**	**2022**	**2023**	**2024**	**2025**	**2021-24 Total**	**2021-25 Total**
Existing mandatory standards	287.4	158.7	163.9	146.6	124.6	756.6	881.2
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	344.8	102.5	129.4	66.0	51.9	642.7	694.6
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	632.1	261.3	293.3	212.6	176.5	1399.3	1575.8
Atkins/Cardno recommended scope/ other adjustments for specific programs or projects							
Reservoir Renewals and Reliability	0.0	-7.6	-3.4	-6.0	1.3	-16.9	-15.6
Water PS renewals scope	-4.1	-4.2	-3.0	-2.8	2.7	-14.1	-11.4
Critical water mains renewal	0.0	0.0	0.0	0.0	-8.5	0.0	-8.5
General growth adjustment	-6.0	-8.0	-7.9	-6.1	10.0	-27.9	-17.9
Metering adjustment	-1.5	-1.5	-1.5	-1.5	-1.5	-6.0	-7.5
Prospect to Macarthur adjustment	-200.5	-17.8	-62.0			-280.2	-280.2
Sub-total scope/other adjustments	***-212.1***	***-39.0***	***-77.8***	***-16.3***	***4.0***	***-345.2***	***-341.2***
ADJUSTED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS							
Existing mandatory standards	221.6	140.1	137.4	136.4	118.5	635.5	754.0
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	198.5	82.1	78.1	59.9	62.0	418.6	480.6
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	420.1	222.3	215.5	196.3	180.5	1054.1	1234.6
Atkins/Cardno recommended additional capital efficiency targets (beyond those applied by the company)							
Continuing efficiency (%)	0.00%	0.80%	1.59%	2.38%	3.16%		
Continuing efficiency ($M)	0.0	-1.8	-3.4	-4.7	-5.7	-9.9	-15.6
Catch-up efficiency (%)	0.00%	0.00%	0.00%	0.00%	0.00%		
Catch-up efficiency ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE							
($M 2019/20) year ending June	**2021**	**2022**	**2023**	**2024**	**2025**	**2021-24 Total**	**2021-25 Total**
Existing mandatory standards	221.6	139.0	135.2	133.1	114.7	629.0	743.7
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	198.5	81.5	76.8	58.5	60.0	415.3	475.3
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Efficient Expenditure	420.1	220.5	212.0	191.6	174.8	1044.2	1219.0

4.3.2. Wastewater

Table 4-13 – Wastewater capital expenditure – 2020 determination period

SYDNEY PROPOSAL - CAPEX - WASTEWATER SERVICE							
($M 2019/20) year ending June	2021	2022	2023	2024	2025	2021-24 Total	2021-25 Total
Existing mandatory standards	383.5	389.9	360.7	379.5	269.8	1513.5	1783.3
New mandatory standards	58.5	59.7	60.7	52.7	0.0	231.6	231.6
Discretionary standards	11.6	16.0	20.4	15.6	0.7	63.5	64.2
Growth - funded by other	266.6	299.1	348.0	373.1	424.9	1286.8	1711.7
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	1.4	1.4	1.4	3.4	3.4	7.7	11.1
Total	721.5	766.2	791.2	824.3	698.8	3103.1	3801.9
Atkins/Cardno recommended scope/ other adjustments for specific programs or projects							
Critical and Non-Critical Mains Renewals scope	-10.0	-9.5	-9.0	-8.6	-6.4	-37.1	-43.5
Quakers Hill and St Marys WWTP variation	14.1	0.0	0.0	0.0	0.0	14.1	14.1
WWTP renewals prudency	-18.0	11.1	7.3	-19.2	38.0	-18.8	19.2
Richmond/North Richmond Amplification		-4.1				-4.1	-4.1
Upper South Creek Expenditure	93.2	19.4	12.1	-48.9	114.2	75.9	190.0
General growth adjustment	-23.0	-21.2	-28.1	-17.9	-22.0	-90.1	-112.1
Wastewater PS civil works	5.0	5.0	5.0	5.0	5.0	20.0	25.0
Sub-total scope/other adjustments	***61.3***	***0.7***	***-12.6***	***-89.5***	***128.7***	***-40.1***	***88.6***
ADJUSTED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS							
Existing mandatory standards	367.5	396.5	364.0	356.7	306.4	1484.7	1791.1
New mandatory standards	58.5	59.7	60.7	52.7	0.0	231.6	231.6
Discretionary standards	11.6	16.0	20.4	15.6	0.7	63.5	64.2
Growth - funded by other	343.8	293.2	332.1	306.4	517.0	1275.6	1792.6
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	1.4	1.4	1.4	3.4	3.4	7.7	11.1
Total	782.9	766.8	778.5	734.8	827.5	3063.0	3890.6
Atkins/Cardno recommended additional program level capital catch-up efficiency targets (beyond those applied by the company)							
"Wet Weather Overflow Abatement" program efficiency	0.0	0.0	-10.9	-9.5	0.0	-20.4	-20.4
Critical and Non-Critical Mains Renewals program efficieny	0.0	0.0	-18.0	-17.9	-6.7	-35.9	-42.6
Sub-total catch-up	***0.0***	***0.0***	***-28.9***	***-27.4***	***-6.7***	***-56.3***	***-63.0***
Atkins/Cardno recommended additional capital efficiency targets (beyond those applied by the company)							
Continuing efficiency (%)	0.00%	0.80%	1.59%	2.38%	3.16%		
Continuing efficiency ($M)	0.0	-6.1	-11.9	-16.8	-26.0	-34.9	-60.9
Catch-up efficiency (%)	0.00%	0.00%	0.00%	0.00%	0.00%		
Catch-up efficiency ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE							
($M 2019/20) year ending June	2021	2022	2023	2024	2025	2021-24 Total	2021-25 Total
Existing mandatory standards	367.5	393.3	340.4	330.7	290.2	1432.0	1722.2
New mandatory standards	58.5	59.2	49.0	42.2	0.0	208.9	208.9
Discretionary standards	11.6	15.9	20.0	15.2	0.7	62.7	63.4
Growth - funded by other	343.8	290.9	326.8	299.1	500.7	1260.6	1761.3
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	1.4	1.4	1.4	3.3	3.3	7.6	10.9
Total Efficient Expenditure	782.9	760.7	737.6	690.6	794.9	2971.8	3766.7

4.3.3. Stormwater

Table 4-14 – Stormwater capital expenditure – 2020 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - STORMWATER							
($M 2019/20) year ending June	2021	2022	2023	2024	2025	2021-24 Total	2021-25 Total
Existing mandatory standards	29.8	43.4	38.8	42.4	22.8	154.4	177.2
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	10.3	10.3	4.5	5.6	6.2	30.8	37.0
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	40.1	53.7	43.3	48.0	29.0	185.2	214.2
Atkins/Cardno recommended adjustments for specific programs or projects							
Stormwater Renewals	0.0	-5.8	-4.6	-5.4	18.3	-15.8	2.5
Waterway health	1.6	1.6	1.6	1.6	-6.5	6.5	0.0
Sub-total scope/other adjustments	***1.6***	***-4.1***	***-3.0***	***-3.8***	***11.8***	***-9.3***	***2.5***
ADJUSTED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS							
Existing mandatory standards	31.4	39.2	35.8	38.6	34.6	145.1	179.6
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	10.3	10.3	4.5	5.6	6.2	30.8	37.0
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	41.7	49.6	40.3	44.2	40.8	175.9	216.6
Atkins/Cardno recommended additional capital efficiency targets (beyond those applied by the company)							
Continuing efficiency (%)	0.00%	0.80%	1.59%	2.38%	3.16%		
Continuing efficiency ($M)	0.0	-0.4	-0.6	-1.1	-1.3	-2.1	-3.4
Catch-up efficiency (%)	0.00%	0.00%	0.00%	0.00%	0.00%		
Catch-up efficiency ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE							
($M 2019/20) year ending June	2021	2022	2023	2024	2025	2021-24 Total	2021-25 Total
Existing mandatory standards	31.4	38.9	35.2	37.7	33.5	143.3	176.7
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	10.3	10.3	4.4	5.5	6.0	30.5	36.5
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Efficient Expenditure	41.7	49.2	39.7	43.2	39.5	173.8	213.3

4.3.4. Corporate

Table 4-15 – Corporate capital expenditure – 2020 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - CORPORATE							
($M 2019/20) year ending June	**2021**	**2022**	**2023**	**2024**	**2025**	**2021-24 Total**	**2021-25 Total**
Existing mandatory standards	109.7	88.5	50.5	45.3	32.3	294.1	326.4
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	29.2	31.3	26.3	18.7	22.9	105.5	128.4
Total	139.0	119.8	76.9	64.0	55.2	399.6	454.8
Atkins/Cardno recommended adjustments for specific programs or projects							
Sub-total scope/other adjustments	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***
ADJUSTED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS							
Existing mandatory standards	109.7	88.5	50.5	45.3	32.3	294.1	326.4
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	29.2	31.3	26.3	18.7	22.9	105.5	128.4
Total	139.0	119.8	76.9	64.0	55.2	399.6	454.8
Atkins/Cardno recommended additional capital efficiency targets (beyond those applied by the company)							
Continuing efficiency (%)	0.00%	0.80%	1.59%	2.38%	3.16%		
Continuing efficiency ($M)	0.0	-1.0	-1.2	-1.5	-1.7	-3.7	-5.5
Catch-up efficiency (%)	0.00%	0.00%	0.00%	0.00%	0.00%		
Catch-up efficiency ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE							
($M 2019/20) year ending June	**2021**	**2022**	**2023**	**2024**	**2025**	**2021-24 Total**	**2021-25 Total**
Existing mandatory standards	109.7	87.8	49.7	44.3	31.3	291.5	322.8
New mandatory standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary standards	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Growth - funded by other	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government programs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business efficiency	29.2	31.0	25.9	18.2	22.2	104.4	126.6
Total Efficient Expenditure	139.0	118.8	75.6	62.5	53.5	395.9	449.4

4.3.5. Total capital expenditure

Table 4-16 – Total capital expenditure – 2020 determination period

SYDNEY WATER CORPORATION PROPOSAL - CAPEX - TOTAL PROGRAM							
($M 2019/20) year ending June	2021	2022	2023	2024	2025	2021-24 Total	2021-25 Total
Water	632.1	261.3	293.3	212.6	176.5	1399.3	1575.8
Wastewater	721.5	766.2	791.2	824.3	698.8	3103.1	3801.9
Stormwater	40.1	53.7	43.3	48.0	29.0	185.2	214.2
Corporate	139.0	119.8	76.9	64.0	55.2	399.6	454.8
Total	1532.7	1200.9	1204.7	1148.9	959.5	5087.2	6046.7
Atkins/Cardno recommended adjustments for specific programs or projects							
Reservoir Renewals and Reliability	0.0	-7.6	-3.4	-6.0	1.3	-16.9	-15.6
Water PS renewals scope	-4.1	-4.2	-3.0	-2.8	2.7	-14.1	-11.4
Critical water mains renewal	0.0	0.0	0.0	0.0	-8.5	0.0	-8.5
General growth adjustment	-6.0	-8.0	-7.9	-6.1	10.0	-27.9	-17.9
Metering adjustment	-1.5	-1.5	-1.5	-1.5	-1.5	-6.0	-7.5
Prospect to Macarthur adjustment	-200.5	-17.8	-62.0	0.0	0.0	-280.2	-280.2
Critical and Non-Critical Mains Renewals scope	-10.0	-9.5	-9.0	-8.6	-6.4	-37.1	-43.5
Quakers Hill and St Marys WWTP variation	14.1	0.0	0.0	0.0	0.0	14.1	14.1
WWTP renewals prudency	-18.0	11.1	7.3	-19.2	38.0	-18.8	19.2
Richmond/North Richmond Amplification	0.0	-4.1	0.0	0.0	0.0	-4.1	-4.1
Upper South Creek Expenditure	93.2	19.4	12.1	-48.9	114.2	75.9	190.0
General growth adjustment	-23.0	-21.2	-28.1	-17.9	-22.0	-90.1	-112.1
Wastewater PS civil works	5.0	5.0	5.0	5.0	5.0	20.0	25.0
Stormwater Renewals	0.0	-5.8	-4.6	-5.4	18.3	-15.8	2.5
Waterway health	1.6	1.6	1.6	1.6	-6.5	6.5	0.0
Sub-total scope/other adjustments	***-149.1***	***-42.4***	***-93.4***	***-109.6***	***144.5***	***-394.6***	***-250.1***
ADJUSTED EXPENDITURE BEFORE APPLICATION OF EFFICIENCY TARGETS							
Water	420.1	222.3	215.5	196.3	180.5	1054.1	1234.6
Wastewater	782.9	766.8	778.5	734.8	827.5	3063.0	3890.6
Stormwater	41.7	49.6	40.3	44.2	40.8	175.9	216.6
Corporate	139.0	119.8	76.9	64.0	55.2	399.6	454.8
Total	1383.6	1158.5	1111.2	1039.3	1104.0	4692.7	5796.6
Atkins/Cardno recommended additional program level capital efficiency targets (beyond those applied by the company)							
"Wet Weather Overflow Abatement" program efficiency	0.0	0.0	-10.9	-9.5	0.0	-20.4	-20.4
Critical and Non-Critical Mains Renewals program efficieny	0.0	0.0	-18.0	-17.9	-6.7	-35.9	-42.6
Atkins/Cardno recommended additional capital efficiency targets (beyond those applied by the company)							
Continuing efficiency (%)	0.00%	0.80%	1.59%	2.38%	3.16%		
Continuing efficiency ($M)	0.0	-9.3	-17.2	-24.1	-34.7	-50.6	-85.3
Catch-up efficiency (%)	0.00%	0.00%	0.00%	0.00%	0.00%		
Catch-up efficiency ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ATKINS/CARDNO ASSESSMENT OF EFFICIENT EXPENDITURE							
($M 2019/20) year ending June	2021	2022	2023	2024	2025	2021-24 Total	2021-25 Total
Water	420.1	220.5	212.0	191.6	174.8	1044.2	1219.0
Wastewater	782.9	760.7	737.6	690.6	794.9	2971.8	3766.7
Stormwater	41.7	49.2	39.7	43.2	39.5	173.8	213.3
Corporate	139.0	118.8	75.6	62.5	53.5	395.9	449.4
Total Efficient Expenditure	1383.6	1149.2	1065.0	987.8	1062.6	4585.7	5648.3

4.4. Efficient capital expenditure by asset type

Based on the revised expenditure above we report in the tables below on our amended findings on efficient capital expenditure by service and asset category.

Table 4-17 Efficient water expenditure by asset category

	2020	2021	2022	2023	2024	2025	Total 2020-24
Civil	161.1	347.9	182.7	162.9	151.9	148.8	845.4
Electrical	8.7	14.3	7.9	11.8	8.8	3.9	42.8
Mechanical	30.7	50.0	25.3	30.4	26.0	20.1	131.8
Electronic	4.1	7.8	4.6	7.0	4.9	2.0	24.3
Non-Depreciable Asset	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Efficient expenditure	204.7	420.1	220.5	212.0	191.6	174.8	1044.2

Source: November 2019 SIR and Atkins/Cardno analysis

Table 4-18 Efficient wastewater expenditure by asset category

	2020	2021	2022	2023	2024	2025	Total 2020-24
Civil	298.2	443.4	431.4	456.9	435.5	454.1	1767.3
Electrical	67.6	93.9	85.8	70.2	79.4	107.1	329.4
Mechanical	81.2	115.5	106.4	86.7	93.2	126.3	401.8
Electronic	32.2	73.1	89.7	61.0	55.3	59.5	279.1
Non-Depreciable Asset	69.0	57.0	47.4	62.8	27.1	47.9	194.2
Efficient expenditure	548.2	782.9	760.7	737.6	690.6	794.9	2971.8

Source: November 2019 SIR and Atkins/Cardno analysis

Table 4-19 Efficient stormwater expenditure by asset category

	2020	2021	2022	2023	2024	2025	Total 2020-24
Civil	18.9	41.7	49.2	39.7	43.2	39.5	173.8
Electrical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mechanical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electronic	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Depreciable Asset	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Efficient expenditure	18.9	41.7	49.2	39.7	43.2	39.5	173.8

Source: November 2019 SIR and Atkins/Cardno analysis

Table 4-20 Efficient corporate expenditure by asset category

	2020	2021	2022	2023	2024	2025	Total 2020-24
Civil	13.0	7.6	10.7	4.1	4.0	5.1	26.5
Electrical	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mechanical	2.9	2.6	2.6	2.2	2.0	2.5	9.3
Electronic	104.7	127.2	103.9	64.6	53.0	41.4	348.7
Non-Depreciable Asset	1.9	1.6	1.6	4.7	3.5	4.5	11.4
Efficient expenditure	122.4	139.0	118.8	75.6	62.5	53.5	395.9

Source: November 2019 SIR and Atkins/Cardno analysis

5. Demand

5.1. Drought and non-drought demands

In its response document, Sydney Water sets out its view of drought and non-drought demands and how they differ from our projections.

Non-drought demand

In Tables 15-1 and 15-2, Sydney Water uses the non-revenue water estimates from its original Submission rather than the Economic Level of Leakage (ELL). However, they also say that they support IPART using the target ELL:

> "For the final Determination, we support IPART using a leakage forecast based on the target ELL in the non-revenue water demand forecast used to determine bulk water costs. We expect the difference in forecasts used for this submission has a negligible impact on annual customer bills"

The rest of Sydney Water's Table 15-1 reconciles with our recommended demands. We therefore recommend no changes to non-drought demand projections on this basis.

Drought demands

Table 15-2 of Sydney Water's document diverges from our projections, as summarised on page 154 of the Response document. In addition to non-revenue water addressed above, the divergence is driven by different approaches to treatment of the 15% total demand savings and price elasticity. Based on the Response document and spreadsheet[25] provided by Sydney Water we conclude:

- Treatment of the 15% demand savings. Sydney Water assumes a 15% reduction in demand for customer demand components. In our projections we assume a greater reduction (16%) in non-leakage demand is required to obtain a 15% overall total system demand reduction to make up for the fact that, at 3%, the reduction in ELL in drought conditions is considerably less than 15%. We have not therefore recommended any changes to our demand projections to match Sydney Water's approach to this.
- Price elasticity. In addition to the 15% saving applied to each element, SWC applies a price elasticity of demand reduction. We did not incorporate price elasticity in our forecasts because (a) price structures and levels hadn't been determined, but, more importantly, (b) we assume that price signals are likely to be one of the levers helping to achieve the 15% demand reduction, rather than to act in addition to the 15%.
    - We have not recommended amending our approach to this as we assume that Sydney Water will work to achieve the measurable 15% reduction with price elasticity effects playing a role in achieving this. To do otherwise implies that a demand reduction greater than 15% will be achieved in drought because SWC will be achieving a 15% demand reduction AND price elasticity will act on top of this.

We therefore recommend making no changes to reflect the differences in approach to drought and non-drought demand.

5.2. Effects of COVID19

Impacts so far

In its response document, Sydney Water states that:

> We do not yet have sufficient data to be able to quantify the impact of COVID-19 and the associated economic disruption on water demand or customer numbers

Based on analysis of demand from 1 March to 15 April 2020, Sydney Water finds that although there appears to be a decline in demand of around 3.6% since 23 March, when strict social distancing was implemented. this was well within the range of variability expected from fluctuations in weather.

COVID19 scenarios

[25] 'SUPP Item 33.1 Drought demand forecast'

Sydney Water has set out three scenarios, the results of which are summarised below:

Table 5-1 – Sydney Water COVID19 Scenarios

Scenario	Impacts on water customer numbers			Impact on total water demand forecasts		
	2020-21	2023-24	Determination Period	In 2020-21	In 2023-24	Determination Period
Scenario 1 - high COVID-19 impact	-0.8%	-2.4%	-1.6%	-4.3%	-2.3%	-3.2%
Scenario 2 - medium COVID-19 impact	-0.6%	-0.7%	-0.5%	-2.9%	-0.5%	-1.6%
Scenario 3 - low COVID-19 impact	-0.2%	-0.2%	-0.2%	-1.2%	-0.2%	-0.5%

Source: Tables 17-7 and 17-13 of Response Document and Atkins/Cardno analysis of Table 17-6

Note: Sydney Water has also prepared projections for wastewater and stormwater customers which produce close by slightly greater effects, with differences at one decimal place only.

Sydney Water's projections do not incorporate any changes in non-residential property forecasts. It expects its largest non-residential potable water users to continue operations and anticipates that the biggest impacts will come from non-residential sectors such as tourism and hospitality, with many non-residential customers, such as office blocks and schools continuing to maintain at least a base level water use, even if attendance drops or operation ceases.

One of the main effects Sydney Water anticipates is the transference of personal use from non-residential to residential sectors, which it expects to have zero net effect on total demand.

Countervailing effects

Whilst the scenarios outlined above point to lower customer number and demand projections than under a non-COVID scenario, there are a number of factors which Sydney Water has identified which tend in the other direction, for example:

- Sydney Water notes that the 2019 Sydney Housing Supply Forecast predicted 1% greater water demand compared with the water demand indicated by the 2016 growth forecast that underpins its original Submission[26], suggesting that COVID19 would need to reduce water demand by 1% just to match the July 19 submission assumptions.
- It has highlighted that it is already seeing increased interest in industrial development as firms seek to bring production back onshore[27]. Sydney Water expects many of the Western Sydney Growth precincts to be employment-only[28], potentially offsetting reductions in non-residential demand elsewhere.
- It anticipates potential offsetting increases for some non-residential sectors such as hospitals and cleaning businesses, noting that Sydney Water has incorporated an estimate of these effects in its scenarios[29].

[26] See Section 17.9.1 of the Response Document
[27] See Section 3.1 of the Response Document
[28] See Sydney Water document "SUPP Item 35.1 Growth and Demand presentation 1May20"
[29] See Section 17.9.3 of the Response Document

- In its April 2020 responses related to growth expenditure, it has identified a number of significant new network growth projects since its July 2019 submission and has identified that it expects more rapid development than was assumed in July 2019, in Western Sydney for example[30].

Estimation variances in previous Determination period

In the last Determination period, variance between the Determination/Sydney Water projections and outturn growth in customer numbers was in the range of +0.4% (water customer numbers) to -1.2% p.a. (stormwater customers), with wastewater having -0.5% p.a. variance[31].

With the exception of Scenario 1 (high impact) the potential impacts of COVID19 on customer numbers are within the range of variance from estimates observed in the last period.

Conclusions

Sydney Water has identified that COVID19 may reduce water customer numbers and demand by up to 1.6% and 3.2% respectively across the 2020 Determination period. In its medium impact scenario the average reductions are approximately 0.6% for customer numbers and 1.6% for demand. We note that the impacts of the low and medium COVID19 scenarios on customer numbers are within the range of estimation variance already experienced in the current Determination period.

Sydney Water has also made the case that growth projections had already increased by approximately 1% compared to those used as the basis for its July 2019 submission, moving the starting point for COVID19 impacts upwards. It has also repeatedly highlighted the potential for greater non-residential growth through development in Western Sydney, for example, and through potential onshoring of production capacity.

Whilst clearly highly uncertain, these effects may counterbalance the reductions in customer numbers and demand anticipated as a result of COVID19.

Taking account of the potential countervailing effects outlined, and given that the low and medium scenario effects are within estimation errors previously experienced, we have not recommended any adjustments to the demand and customer number projections set out in our Final Report.

[30] See Sydney Water documents “SUPP Item 35.1 Growth and Demand presentation 1May20” and “SUPP Item 36.1 New growth projects”
[31] See Table 4-3 of our Final Report

6. Finance Leases

This area of expenditure relates to upgrade works at the Macarthur and Prospect filtration plants to meet new water quality and other requirements. These plants are operated by private companies under BOOT arrangements and are subject to finance leases.

In our Final Report we stated:

> *We consider the Sydney Water costs are higher than we would expect from similar design and construct projects. We have therefore applied an overall [redacted] efficiency to address potential savings in design including value engineering ([redacted] efficiency), cost estimates ([redacted]), procurement ([redacted]), risk and project management including contingencies ([redacted]).*

We also recommended re-profiling the proposed expenditure to reflect what we consider to be a most likely program and made some adjustments to asset lives.

Sydney Water commented, in its response to the Draft Determination, on the adjustments to the proposed expenditure at the Prospect plant related to:

(i) The re-profiling of expenditure to reflect a more likely program of work; Sydney Water has accepted this reprofiling as being reasonable.

(ii) The application of an efficiency adjustment on future expenditure;

(iii) The adjustments made between our proposed expenditure and the IPART profile included in the Draft Determination.

Efficiency reduction

[redacted]

Table 6-1 shows the impact of the recommended expenditure reprofiling and application of an efficiency adjustment on expenditure from year 2021. Expenditure is also disaggregated by asset type. We note that IPART is adopting common asset lives for all future capital expenditure and finance leases.

Table 6-1 – Prospect Water Filtration Plant expenditure

[redacted]

Note: $ values for years 2017 to 2019 are nominal; future years are at 2019/20 base.

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